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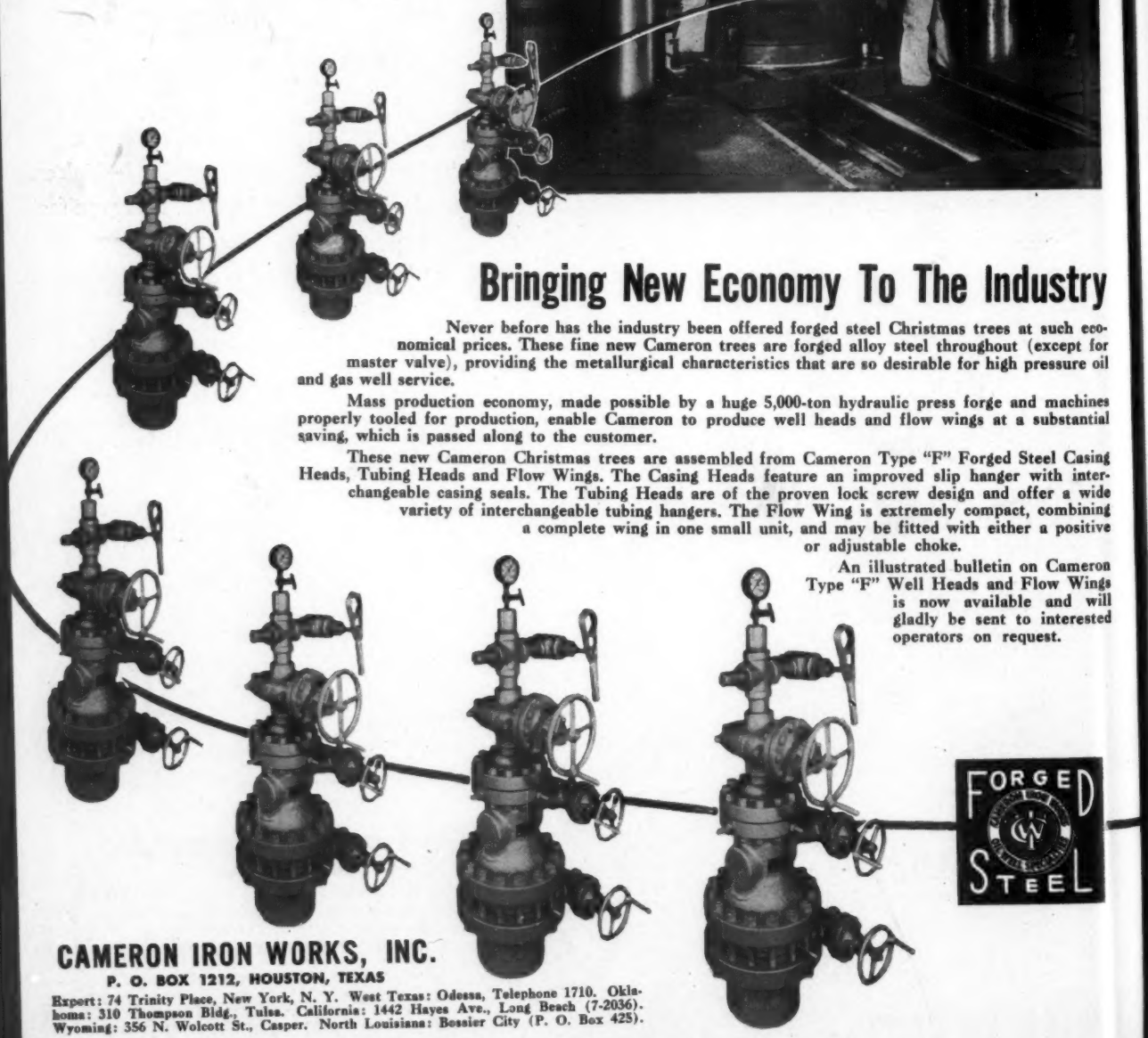
Cameron

FORGED STEEL
Christmas Trees In Mass Production



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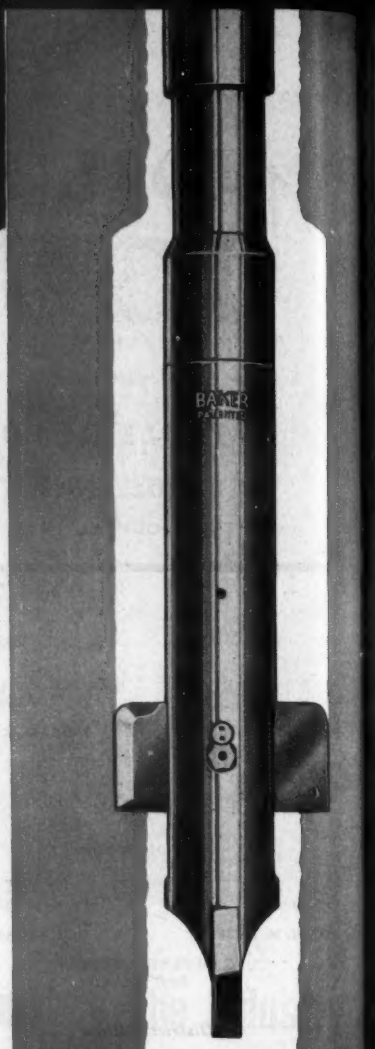
It "scrapes for a living"... and always "comes out on top"



The BAKER WALL SCRAPER has many important uses in modern drilling.

When it is desirable to enlarge the diameter of an open hole to an extent considerably greater than the diameter of the casing, you can depend upon this strong, safe Wall Scraper with blades which open positively when pump pressure is applied. The uncased hole can be *enlarged at any point*, and by changing to progressively larger sizes of blades, an amazingly increased diameter can be secured. For example, the No. 6 Scraper can be run safely through 9⅝" API casing, and then will ream from a minimum of 9¼ inches to a maximum of 19 inches by changing to increasingly larger sized blades.

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IMPORTANT NEW IMPROVEMENT

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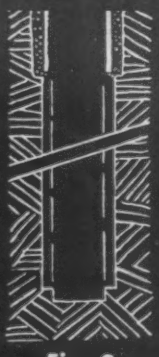
These typical uses illustrate a few of the many worthwhile applications of the Baker Rotary Wall Scraper.

Figure 1—WATER SHUT-OFF TESTS are made after rat-holing below the shoe, "wall scraping" for a vertical distance of 5 feet or more to the gauge of the original hole (or slightly beyond). Figure 2—ENLARGING HOLE TO SET CASING OR LINER with maximum ease and safety. Figure 3—REMOVING MUD SHEATH from the face of the formation to permit cement to bond with original formation. This same procedure is used to scrape the face of the oil sand to increase production. Figure 4—BOTTLENECKING to insure complete encasement of the shoe joint with cement; also to minimize hazard of channeling at this vital point. Figure 5—ENLARGING HOLE FOR C.P. JOB—showing "bottlenecked" section with casing or liner serving as water string above, and oil string below, the cementing point. Figure 6—GRAVEL PACKING is easily and effectively performed when the hole has been enlarged with a Baker Rotary Wall Scraper.

BAKER
ROTARY HYDRAULIC EXPANSION
WALL SCRAPER

Fig. 1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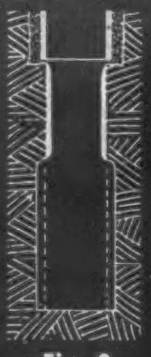
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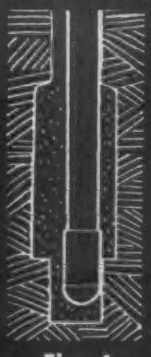
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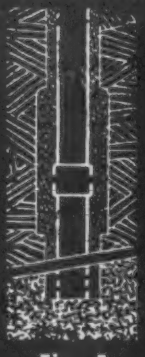


Fig. 5

Fig. 6

THE OIL AND GAS JOURNAL

Enough Control

TWO Congressional committees have undertaken investigations of the oil shortage which has official Washington so aroused. If the inquiries are honestly conducted, the oil industry has nothing to fear.

The facts will show that the industry is producing more than ever in history and straining every facility to do more but that it can scarcely keep up with the unprecedented increase in demand. If the investigators follow through they will conclude that this demand is due to the continued high level of business activity and virtually full employment, with every industrial and individual consumer using a little more gasoline and fuel oil than was anticipated.

Looking still further it should be admitted that the Government's policy of aiding war-torn nations has pushed exports of many things to tremendously high totals, with the twin results of increasing business activity and draining off supplies of steel which otherwise could expand petroleum output. Domestic oil producers point out that this policy has deprived them of equipment at a time when they needed it most to recover on war-retarded drilling and exploration programs.

This lays the oil shortage on the Government's doorstep. It is encouraging that the administration has finally recognized the impact of its foreign policy on our domestic economy. President Truman has appointed three committees to report on the nation's resources, the economic requirements of foreign countries, and the limits to which we may extend aid. The House foreign affairs committee is engaged in a similar study. The Senate has just passed an export control bill creating an administrator to balance export requests with domestic needs.

Such factual examination of our foreign policy is more realistic than the demands being made by some congressmen to embargo all exports of petroleum and steel. Certain of our foreign commitments must be kept, and they require export of some oil and steel. It may also be that export of oil-industry equipment to American operations abroad will produce more oil per ton of steel than if used here, and thus relieve our offshore shipments somewhat. Nevertheless, it seems well substantiated that the administration has been giving priority to export requests without consideration of domestic needs.

If our foreign policy requires a little belt tightening, this should be frankly admitted. But it does not follow that we must have rationing or distribution control of petroleum products, nor regulation of drilling and facilities in the name of steel conservation. If the Government will use its powers over exports wisely and openly, the oil industry can plan and perform without aid or regulation from Washington.

PETROLEUM—A *PROGRESSIVE* INDUSTRY

Crude Prices Still Pointed Upward; Speculation Continues

THE continued unrelieved seller's market in crude oil is causing wide speculation on the question of when another general price advance for the industry's principal raw material will occur.

The subject remains the liveliest topic of conversation in most Mid-Continent and Southwest oil circles. Regardless of the wisdom or the desirability of an increase, a sizable group within the industry is firmly convinced it will materialize. A strong case can be made either in favor of or in opposition to higher crude postings.

Whether such a move would be to the best over-all benefit of the industry was questioned late last month when Eugene Holman, Standard Oil Co. (N. J.) president, declared in a speech at Bradford, Pa., that the Jersey Standard management believes present crude prices "under today's conditions are adequate in a majority of cases." A week later, Russell B. Brown, Washington representative of the Independent Petroleum Association of America, again presented arguments of producers.

Additional indications of the tightness of the crude-oil market are constantly coming to light. In Dallas, it was reported one major purchaser is offering a premium of 15 cents above posted prices for 3-year connections, and that another affiliated company is giving 3-year contracts with the present price as the minimum.

Connection Inducements

Premiums and various other less direct inducements for connections have characterized the crude market for more than a year. In addition to premiums ranging up to 25 cents a barrel for some particularly sought-after grades, producers reportedly have taken bonuses in the form of badly needed casing or pipe, better credit at supply houses, lines to isolated wells, and in some cases gifts of new automobiles. One illustration of crude-oil demand was the recent report that certain types of heavy-gravity black Wyoming crude are commanding a 7-cent a barrel premium. One crude-purchasing official said premiums appear to be the rule rather than the exception in Texas but are less common in Oklahoma and Kansas.

This same official pointed out that the widespread payment of bonuses and premiums indicates that the market is able to stand another crude advance without a corresponding increase in products prices. The premium system, he said, in some cases is unfair to the royalty owner since whatever inducement is given frequently goes only to the operator.

As this official put it, crude will go higher before it goes lower. The question is when one of the major purchasers will find itself with enough lost connections to force higher postings.

In case of an announcement by a major purchaser, all companies would quickly fall in line, including, it is believed, Jersey Standard. This is necessary because purchasing companies would be forced to protect their connections.

Long-Range Benefit

Although producers argue still higher prices are necessary to stimulate exploratory drilling, some industry observers declare that under existing conditions another price advance would bring little if any more crude on the market. The industry is now producing at its maximum level, and previous advances left the market as tight as ever. The reply to this is that the benefit is a long range one and it is over an extended period that the supply will be eased.

Most observers of the situation agree that the major obstacle to greater exploration, and consequently production, is the lack of sufficient steel products, particularly tubular goods. Those favoring a "hold the line" policy on crude prices at the present time assert there is nothing about higher prices which will add to the flow of steel supplies to the oil industry.

The pro and con on the crude question involves many ramifications. Generally, the major integrated companies in the industry, sensitive to criticism of higher products prices and closest to the public with their marketing organizations, are either opposed or lukewarm to another advance. On the other side are the smaller producers whose sole income generally is off their production. Most eager for an increase are the small stripper-well operators. For this latter group, some of the earlier increases were offset by loss of federal conservation payments.

Holman, in his discussion before the Bradford District Oil Producers Association, pointed out that in the present situation there is "a strong urge to bid up prices in the competition for available supplies." He continued: "It is difficult to see any benefit to the public—in either supplies or better products—from further increases in crude oil prices at this time. The principal problem of our industry today is not that of prices but that of providing the maximum possible quantities of oil products to meet the public's pressing need and growing demand."

In answer to Holman, Brown said he knew of "no formula" by which the increases in crude prices during the past year have totaled exactly "the right amount." He said: "It may be that in the producing operations of Jersey Standard that is true. The company and its subsidiaries have more avenues to profit than have those who rely on the production of crude oil alone. Regardless, though of the situation of Jersey Standard, Mr. Holman's conclusions are in disagreement with the finding of the National Crude Oil Advisory Committee."

Brown cited figures showing that today's average crude oil price of $1.89 per barrel is 69 cents over the depressed wartime price but still subnormally low.

Holman's comments and Brown's material served as a stimulant to discussion on the question. Advances in crude postings in California and Pennsylvania provided the Mid-Continent and Southwest areas with added fuel for the controversy, and it appeared to be continuing unabated.

Compact Group to Study Cotton Valley Suit

The legal committee of the Interstate Oil Compact Commission has been requested by the compact's executive committee to make a study of the antitrust action recently instituted against the Cotton Valley (La.) Operators Committee by the U. S. Department of Justice (*The Oil and Gas Journal, June 28, page 76*).

The suit is the first filed to attack a cooperative cycling and processing project. The legal committee was requested to make a report on the case at the summer quarterly meeting of the compact in Great Falls, Mont., August 11-13.

The executive committee requested the study at its recent meeting in Oklahoma City at which it also passed a resolution asking Congress to enact legislation giving the states quitclaim title to submerged lands affected by the U. S. Supreme Court's recent "tidelands" decision.

The executive group made final preparations for the Great Falls meeting, deciding to extend formal invitation to the Province of Alberta, Canada, to send an observer to the meeting. Compact officials are asking persons planning to attend the meeting to make hotel reservation requests early to the compact headquarters in Oklahoma City.

Investigation Spotlight Focuses On Petroleum Supply

WASHINGTON. — The threat of short petroleum products supplies continued to worry official Washington this week, constituting the chief concern of the National Petroleum Council as it prepared to meet for its quarterly session July 10.

The House interstate commerce committee resumed the investigation into the subject it opened last week with statements from Max W. Ball, director of the Oil and Gas Division, and John W. Boatright, of Standard Oil Co. (Ind.) *(See page 49).*

At the same time officials of the Army-Navy Petroleum Board met with the NPC subcommittee on military supply to renew complaints that insufficient bids are being made for supplies of petroleum products badly needed by the armed forces.

Meanwhile the Senate public lands committee prepared to open a full investigation July 14 into all factors underlying the threat of an oil shortage.

Resuming its inquiry by questioning officials of several government agencies, the House interstate commerce committee announced that it would also look into problems of steel supply and exports, which appears to be the key to the petroleum problem, and will also hold an executive session with Army and Navy officials to hear secret plans for obtaining military supplies of oil in a national emergency.

Col. G. H. Vogel, of the Army-Navy Petroleum Board, told the committee Tuesday that during the peak of the war the military was taking petroleum products equivalent to 32 per cent of United States crude production and for the 1948 fiscal year its requirements will be only 4 per cent but still government bids are not being covered and new requests are being made to the executives of all large suppliers to bid on government orders at once. For the next 6 months, he said, the military has requirements still not covered by contracts for 1,000,000 bbl. of motor gasoline, 1,600,000 bbl. of aviation gasoline, and 500,000 bbl. per month of Navy special fuel oil.

Import Restriction Advocated

Charles B. Rayner, of the State Department, said imports of petroleum should be restricted to the requirements left unfilled beyond maximum efficient production of domestic fields, and he thought the present situation is abnormal and temporary and that with more steel the domestic oil industry can expand its transportation facilities to catch up with the demands.

Director Monroe Johnson of the Office of Defense Transportation told the committee that recent actions have assigned 3,136 additional tank cars to special service moving 99,300 bbl. daily of petroleum products into the midwestern shortage area in connection with pipe lines from the Southwest, and he expects delivery of 450 new Tank cars per month the balance of this year. He declared that rail transportation of petroleum will be in better shape than the transportation of most other commodities.

Undersecretary of Commerce William C. Foster, explaining the policy to be followed now that petroleum is again subject to export control, said that prohibition or drastic reduction of oil exports would disrupt the world system of distribution and cause international friction. The policy of the department, he said, is to require all countries customarily drawing petroleum from the United States to submit their requirements for study. These requirements will be examined by this Government in terms of their urgency, the contribution which the requested export will make toward the interests of the United States, and the ability of the United States to supply, with due consideration for the needs of the domestic economy, and on this basis export quotas will be established for each country.

Testifying before the House interstate and foreign commerce committee last week, Max W. Ball, director of the Oil and Gas Division of the Department of the Interior, used a chart to show committee members the extent of current unprecedented demand for petroleum products

Russians Seek Permits To Complete Loadings

Reports from Los Angeles last week said Amtorg, the Soviet purchasing agency, is seeking export licenses to complete the loading of Russian ships caught by the reinstatement of government controls on exports of petroleum products effective June 30.

Three Russian ships, the Taganrog, Maikop, and Suchan, failed to complete loading before controls were reimposed. An official at the port declared the ships will be required to obtain export licenses or pump back their cargoes.

The Maikop, a 50,000-bbl. capacity tanker, had loaded 25,000 bbl. of oil. The Taganrog, of 120,000-bbl. capacity, took on about 68,000 bbl. of kerosine, lubricating oil, and other products. The 36,000-bbl. capacity Suchan lifted 20,000 bbl. of diesel oil and gasoline in drums before the deadline.

Another Russian ship, the Krasnia Armia, was awaiting loading when the controls were reinstated, and it was said Amtorg may also ask for permission for this vessel to take on cargo.

Service Station Has Fortieth Anniversary

An estimated 50,000 persons attended the recent opening of a new three-level service and parking station in Seattle, Wash., by Standard Stations, Inc., on the fortieth anniversary of the establishment of the world's first service station.

The new station is located near the site of the first service station, erected by John McLean, of Standard Oil Co. of California.

Nation's Refining Capacity Placed At 5,648,102 Bbl. Daily

WASHINGTON.—The petroleum refining capacity of the United States on June 30 was 5,648,102 bbl. of crude throughput daily, according to a report of the committee on refining capacity of the National Petroleum Council.

The committee, headed by Dr. Robert E. Wilson, chairman of the board, Standard Oil Co. (Ind.), stated that during the first 3 weeks of June refinery runs averaged 5,130,000 per day, or an operating rate of 91 per cent of capacity, and concluded that this shows clearly that from an overall viewpoint there is no shortage of refining facilities in this country. However, the committee added, this operating rate leaves very little flexibility or factor of safety and tends to aggravate the shortage of transportation.

Operating refineries on June 30 had a capacity of 5,420,547, while shutdown refineries had a capacity of 227,555 bbl. daily. The committee said that 85,000 of this capacity was shut down by strikes, while some of the remainder is badly located from a transportation standpoint, or partially or wholly obsolete, or unable to handle the high-sulfur crudes which are available.

The report was based on detailed figures as of March 31, 1947, at which time the total capacity was 5,588,402 bbl. daily, of which 332,555 was shut down, including 175,000 on account of strikes. At that time daily runs were 4,843,000 bbl., or 86.7 per cent of capacity. On the basis of information obtained since the survey, the committee reported that the situation as of June 30 was as shown in the accompanying Table 1.

The figures represent the average annual rate anticipated for refinery equipment installed on a given date, allowing for normal shutdown periods, and assuming normal yields from crudes usually run. Shutdown capacity does not include dismantled capacity, but is supposed to represent capacity which is operable although much of it may need minor repairs.

On the basis of information furnished by all companies known to plan new construction, the committee estimated that additional refining capacity will be installed as indicated in Table 2.

This amount of increased capacity, the committee said, seems rather small in view of the large sums which are currently being expended in refinery construction, but many of the improvements will improve gasoline yield or quality or permit handling a wider variety of crudes without substantially increasing crude running capacity.

TABLE 1—UNITED STATES REFINING CAPACITY BY DISTRICTS
(Figures in barrels daily).

PAW Dist.	Operating	Shut-down	Total
I	936,275	5,500	941,775
II	1,406,880	49,560	1,456,440
III	1,928,825	133,000	2,061,825
IV	177,617	3,595	181,212
East of Calif.	4,449,597	191,655	4,641,252
V	970,950	35,900	1,006,850
Total U. S.	5,420,547	227,555	5,648,102

Pennsylvania May Reverse Stand Opposing Inch Lines

WASHINGTON.—Hearings opened before the Federal Power Commission this week on the application of Texas Eastern Transmission Co. for a permanent certificate to purchase and operate the two Big Inch pipe lines it now leases from the Government, amid reports that the State of Pennsylvania may alter its position and endorse the transmission and sale of natural gas throughout the entire state.

Pennsylvania previously filed notice of intervention but its stand has been that while Gulf Coast gas might be brought into the state to supplement local supplies in the Pittsburgh area, it opposed use of the Big Inch lines across the state and sales in the eastern areas.

The opening hearing was consumed largely by preliminary statements of the parties and intervenors, and the taking of testimony may require several weeks.

David T. Searls of Houston, attorney for Texas Eastern, announced the company has contracts with Philadelphia Electric Co. and Philadelphia Gas Works Co. for sale of 80,000,000 cu. ft. a day in that area. The company recently amended its application to provide initial service only as far as the Philadelphia area, whereas the original plan was to start service at once to the northeast section of New Jersey. *(For related news, see page 111).*

TABLE 2—NEW REFINERY CAPACITY EXPECTED TO BEGIN OPERATING IN:
(Figures in barrels daily)

PAW district:	1947 2nd quarter	1947 3rd quarter	1947 4th quarter	1948 1st quarter	1948 2nd quarter
I	1,500	.....	.....	.....	.....
II	31,700	22,600	19,500	16,700	.....
III	13,500	19,500	.....	23,500	14,000
IV	2,000	7,000	.....	.....	.....
East of California	48,700	49,100	19,500	40,200	14,000
V	6,000	90,000	.....	.....	.....
Total United States	54,700	139,100	19,500	40,200	14,000

Canadian Crude Output Shows Increase in April

Production of crude oil in Canada during April showed a daily average increase of 649 bbl. over March. Total April output was 602,129 bbl. The figure was considerably below that of April 1946.

Production of natural gas showed a sharp drop, from 178,003,000 cu. ft. daily in March to 146,871,000 cu. ft. daily in April. April production, however, still was above that of the same month a year ago.

General American Buys 48 Cotton County Wells

M. E. Wilson, executive vice president of General American Oil Co., Dallas, has announced purchase by the company of oil-producing properties, consisting of 50 producing wells, at a price in excess of $3,000,000.

Wilson said 48 wells in Soldier's Creek pool of Cotton County, Okla., together with 1,000 acres of leases, were bought from A. R. Dillard, Wichita Falls. Two other wells obtained from Dillard are in Keystone-Ellenburger field, Winkler County, Texas.

Phillips Donation Revealed

Frank Phillips Foundation has donated $100,000 to the $1,800,000 fund drive of Lafayette College, Easton, Pa. The foundation is backed by Phillips, chairman of the board of Phillips Petroleum Co. and a trustee of Lafayette.

Compact Bill Passed

The House of Representatives early this week passed and sent to the White House a resolution approving a 4-year extension of the Interstate Oil Compact Commission, now 12 years old.

this week

REFINING—National Petroleum Council committee headed by Dr. Robert E. Wilson, Indiana Standard board chairman, reports nation's total refining capacity to be 6,648,102 bbl. daily. . . . Report denies any over-all shortage of refining facilities but declares that present operating rate leaves little flexibility or safety margin. . . . Wilson says refinery expansion has been retarded both during and since the war by materials shortages and general government policy of "discouraging or refusing approval" of projects. . . . ¶Eastern States Petroleum buys surplus 100-octane government plant in Houston for $2,000,000. . . . ¶Bay Petroleum announces construction under way on new reforming unit for Denver refinery. . . .

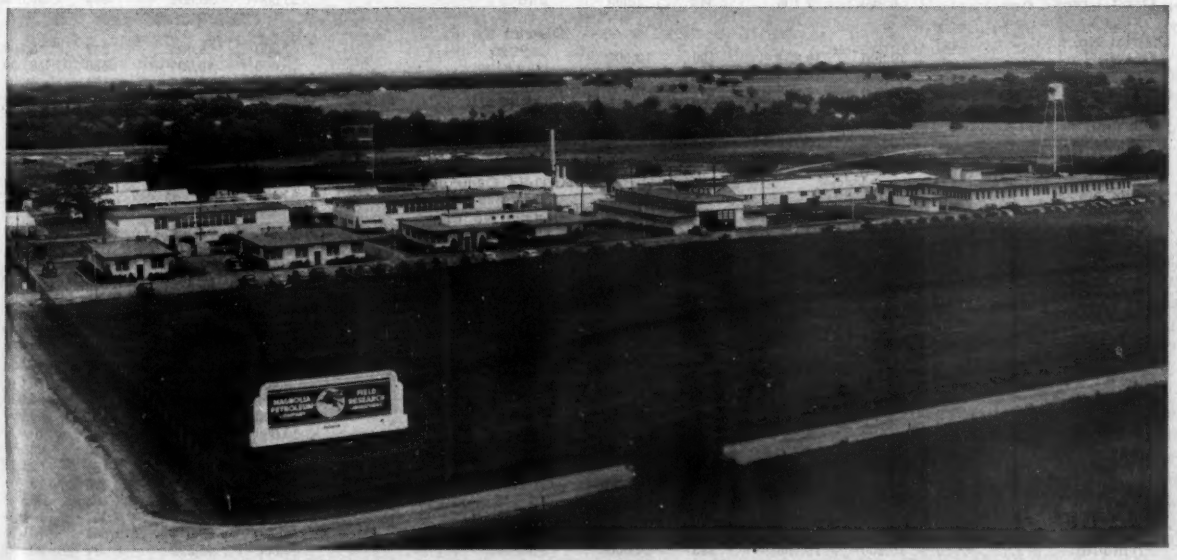
INVESTIGATIONS—Several congressional committees launch inquiries into various phases of petroleum supply situation. . . . House commerce committee resumes hearings this week after earlier testimony from Max W. Ball, OGD head, and John W. Boatwright, Indiana Standard economist. . . . Boatwright tells group industry's present high-level operations promises supply improvement in near future. . . .

NATURAL GAS—Debate expected to get under way this week in the House on a revised Rizley bill to amend the Natural Gas Act and curb jurisdiction of FPC. . . . Representative Rizley introduces new measure as a parliamentary maneuver to speed action. . . . Industry hopes for action this session. . . . ¶A.G.A. nominating committee names Hudson W. Reed, Philadelphia Gas Works president, to succeed R. H. Hargrove as association president. . . . ¶Fight over Michigan-Wisconsin project continues with Panhandle Eastern Pipe Line Co. filing second petition in Court of Appeals to set aside FPC action granting certificate. . . .

SUPPLY AND DEMAND—Bureau of Mines estimates demand for domestic crude oil during July at 5,020,000 bbl. daily. . . . Forecast reiterates maximum use of refinery and transportation facilities necessary if potential demand is to be met the remainder of this year. . . . July gasoline demand figured by bureau at 2,455,000 bbl. daily.

BIG INCH—FPC opens hearings in Washington on application of Texas Eastern Transmission for permanent operation of the Inch system. . . . Testimony expected to continue several weeks with numerous intervenors to be heard. . . . Opening of hearing follows action of Texas Eastern in amending application asking approval of 21 compressor stations instead of 27 previous planned. . . . ¶Reports indicate Pennsylvania may reverse previous stand against movement of natural gas across the state. . . .

EXPLORATION—Second well in Little Alamo pool, McMullen County, Texas, flows 127 bbl. 28°-gravity oil from new, deeper pay at 4,078-81 ft. . . . ¶Humble well southeast of Lolita field, Jackson County, Texas, flows 55 bbl. of 48°-gravity oil from 7,865-71 ft. . . . ¶Pickett Ridge field, Wharton County, Texas, has well in new pay at 4,611-16 ft. flowing 139 bbl. 24°-gravity oil. . . ¶Stanolind opens shallow production in Cameron Parish, Louisiana. . . . ¶New gas pool opened 1 1/2 miles northwest of Cymric field, Kern County, California. . . .



Magnolia Petroleum Co.'s field research laboratories, located 10 miles southwest of Dallas, comprise a self-sufficient unit of laboratories, shops, utilities, and offices removed from electrical interference and vibration of the city. This research center was the scene of intensive work on new refining processes during the war, and recently has been converted completely to the study of exploration, drilling and production problems. A comprehensive article on the laboratories will appear in The Oil and Gas Journal's July 19 issue

New Texas Survey Reveals Gain In 1947 MER Estimates

by George Weber

NEW MER estimates for 1947 covering most of the flowing fields of Texas reflect an increase in the state's ability to produce crude oil without waste. Termed the "most efficient rate" at which a reservoir can be produced, the MER estimate was made for each field by the Texas Railroad Commission after hearings held during April and May.

Employed as a basis for fixing the allowable production of flowing fields in the state, the newly compiled MER figures saw prompt application in the July reduction of allowable at total of 60,678 bbl. daily in 75 fields which were producing in excess of the new MER estimates *(The Oil and Gas Journal, July 5, page 54)*. Although admittedly estimates, and sometimes arrived at by devious means, the MER figures submitted to the commission by operators are weighed and determined by that body. They are of interest principally as bases for determining allowables, and they provide a general index of the trend of the state's producing capability.

Fields surveyed in the current MER report comprise only a fraction of the total in the state. Not included are marginal, unprorated pools. Also absent from the report is East Texas, which is considered by itself. The report surveys only a fraction of the potential which Texas fields can produce with best efficiency, but that fraction represents most of the important reserves of the state.

Of a total of over 500 fields and reservoirs on which data were requested, new 1947 MER estimates were determined for a total of 491 reservoirs. A summary of these data is shown in accompanying Table 2. The 491 fields surveyed show a total daily MER of 1,653,317 bbl. of oil, an increase of 10.2 per cent over MER's reported in October 1946. Actually, discounting some old fields added to this year's survey, the gain may be reasonably estimated at between 8 and 9 per cent.

A total of 126 fields, added to this year's list account for about 104,000 bbl. of the 153,000-bbl. gain over 1946 estimates. Most of the fields added are newly discovered and developed. The net gain in MER shown for fields included on both surveys is 3.2 per cent.

With two notable exceptions, all districts showed small to moderate gains in MER this year. District 2 (Lower Gulf Coast) sustained a decline in total MER of 6,258 bbl. due to a lack of new production to offset downward revisions in established fields. District 8 (West Texas) gained 87,064 bbl., leading other districts by a wide margin. Discounting Foster, an old field added to the 1947 report, newly developed fields in West Texas accounted for most of the total net gain in MER. Most of the larger fields of the area retained their 1946 estimates of most efficient production rates.

Allowables Close to MER

For the purpose of direct comparison, in the accompanying Table 1, June allowable figures are tabulated for only those fields given 1947 MER's. Although total current MER exceeds June allowable, the allowed withdrawals for that month exceeded most efficient production rates in some districts, notably the Upper and Lower Gulf Coast and South Texas. West Texas, restricted by transportation capacity was allowed about 53,000 bbl. less than the fields surveyed were capable of producing. Despite a record tank-car movement of crude, augmenting capacity pipe-line runs,

TABLE 1—TEXAS FIELDS WITH NEW MER'S OF 5,000 BBL. DAILY OR MORE
(Figures in barrels daily)

Field—	1946 MER	June 1947 net allowable	No. of wells	1947 MER
District No. 1:				
Darst Creek	8,000	7,106	343	7,000
District No. 2:				
Greta	10,500	10,984	190	10,500
Heyser	6,000	6,087	170	5,000
Lolita	6,000	6,903	211	6,000
McFaddin	6,300	5,829	84	5,500
Placedo	6,660	6,709	141	6,660
Tom O'Connor	50,000	56,732	540	50,000
West Ranch	22,500	23,640	459	20,000
District No. 3:				
Bay City	5,100	5,407	53	5,000
Conroe	62,500	63,726	892	62,000
Fairbanks	6,246	6,810	267	5,580
Fannett	10,000	9,987	73	9,000
Hastings	60,000	60,742	655	60,000
Magnet Withers	8,000	8,339	248	8,000
Manvel Oligocene	6,100	6,643	87	6,200
North Withers	7,500	7,466	155	8,100
Oyster Bayou	6,500	7,425	21	6,850
Raccoon Bend	7,000	7,241	82	7,000
Stowell	15,000	15,855	101	12,500
Thompson 3,600 ft.	31,000	30,642	221	36,000
Thompson, North	6,000	6,652	55	5,000
Thompson, South	8,200	7,614	82	8,000
Tomball	10,000	9,920	425	10,000
Webster	60,000	59,441	208	60,000
District No. 4:				
Agua Dulce	12,000	11,736	198	12,000
Colorado	5,000	4,930	237	5,000
Plymouth	10,600	10,758	193	14,000
Rincon	7,500	6,932	140	7,750
Seeligson (all zones)	37,716	41,149	612	32,842
Stratton	10,000	13,474	257	12,500
Tijerina-Canales	6,675	9,692	127	9,225
White Point, East	12,000	12,857	349	14,065
Willamar	16,000	15,772	205	12,300
District No. 5:				
Van	30,000	30,692	564	30,000
District No. 6:				
Cayuga	7,000	6,495	247	6,800
Hawkins	45,000	48,704	586	48,000
Long Lake	5,400	5,216	151	5,200
Quitman	6,900	7,907	82	8,200
Talco	25,000	24,574	749	25,000
District No. 7-C:				
Todd Deep (Ellenburger)		11,700	51	11,110
Todd Deep (Crinoidal)		3,601	30	3,490
District No. 8:				
Cowden, North	25,920	24,003	644	25,920
Foster		20,841	621	30,334
Fuhrman-Masche	5,000	4,391	211	5,000
Fullerton	28,140	28,426	468	40,000
Fullerton (8,500 ft.)	3,600	4,771	51	5,100
Garza	5,500	6,269	131	5,500
Goldsmith	25,000	22,896	1,020	25,000
Jordan	6,600	5,960	226	6,600
Keystone Ellenburger	32,500	27,483	146	27,000
Keystone Holt	4,400	4,928	63	5,040
McElroy	35,000	33,245	711	35,000
Means	4,000	4,000	181	6,000
Sand Hills Tubb	10,000	9,612	285	10,000
Seminole	22,000	20,155	329	22,500
Slaughter	55,000	59,256	2,101	55,000
TXL Devonian	13,800	13,460	90	18,000
TXL Ellenburger	16,450	28,841	103	30,900
Ward, North Estes	12,000	10,676	902	10,500
Wasson	78,000	69,017	1,562	78,000
Yates	50,000	45,529	77	50,000
District No. 9:				
Hull-Silk-Sikes	12,500	11,528	431	12,500
Hildreth	8,900	5,597	112	5,000
K.M.A.	16,000	14,560	1,587	15,000
K.M.A. Ellenburger	6,000	5,744	176	5,000

TABLE 2—DATA SHOWING MOST EFFICIENT RATES OF PRODUCTION ON CERTAIN FIELDS IN TEXAS

(Figures in barrels daily)

District	1946 report		June 1947 allowable	1947 report			MER Gains '47 over '46
	No. fields	MER		No. fields	No. wells	MER	
1	10	12,810	14,116	12	546	13,918	1,108
2	50	163,980	171,013	66	2,920	157,775	*6,258
3	91	422,858	450,294	111	6,282	437,489	14,631
4	68	170,680	187,747	87	3,775	181,638	10,958
5	6	32,108	34,990	7	621	33,926	1,818
6	12	99,250	108,263	17	2,144	108,346	9,096
7-B	10	12,520	16,271	20	610	17,163	4,643
7-C	1	4,500	22,719	7	185	22,216	17,716
8	79	505,163	538,865	99	12,286	592,227	87,064
9	35	74,692	83,447	59	3,502	83,954	9,262
10	2	1,620	2,874	6	33	4,665	3,045
Total	126	1,500,161	1,629,599	491	32,959	1,653,317	153,056

*Decline. Source: Texas Railroad Commission.

the bulk of that extra potential is still unavailable in refining and marketing areas. Although the survey indicates that for the fields considered, Texas still has a slight reserve of efficient producing capacity over and above the record market demand, part of that reserve is unavailable because of insufficient distribution facilities. The net picture indicates that the state must meet current demand with production rates which equal or approximate the most efficient rate of withdrawal from its prorated reservoirs.

Listed in Table 1 are detailed data on the larger fields surveyed. Greatest gains were made in the Fullerton and TXL fields of District 8. The greatest daily per well rates were also estimated for District 8, in three Ellenburger reservoirs. The MER per well in Fullerton is 500 bbl. daily, for Monahans 400 bbl., and for Bedford 350 bbl. Few drastic reductions were made in the new MER estimates as compared with the 1946 survey. Some of the fields receiving marked declines are: Stowell, District 3; Seeligson and Willamar, District 4; Keystone Ellenburger, District 8; and Hildreth, District 9.

July Crude Demand Estimated at 5,020,000 Bbl. Daily

COMMENTING that refinery capacity and transportation facilities must be operated at capacity levels if potential demand for the balance of the year is to be met, the U. S. Bureau of Mines has estimated requirements for domestic crude petroleum during July at a record-breaking 5,020,000 bbl. daily.

The July crude demand total compares with an estimate of 4,940,000 bbl. daily in June, 4,871,000 daily in May, and an actual indicated April demand of 4,725,000 bbl. daily.

Among the factors upon which the bureau based its July crude forecast was an indicated demand during the month for motor fuel of 76,100,000 bbl.—an average of 2,455,000 bbl. daily. The bureau said crude runs to stills during the month should equal domestic production since imports should be balanced by exports, fuel, and losses. In view of the unusual decline in stocks of finished gasoline during the second quarter, which offset the seasonal increase during the winter, the high average yield of 42 per cent of gasoline is indicated for the third quarter.

Both domestic crude production and refinery runs to stills are continuing at high levels, though down somewhat from the record figures of a few weeks ago, other weekly industry reports show. Domestic crude production was reported at 5,079,160 bbl. daily last week (for other figures, see pages 136 and 137). For the week ended June 28, production was 5,115,635 bbl. daily, and runs, 5,093,000 bbl. daily; for June 21, production, 5,123,295 bbl. daily, and runs, 5,074,000 bbl. daily; and June 14, production, 5,117,890 bbl. daily, and runs, 5,164,000 bbl. daily.

Demand for All Oils

Demand for all oils, the bureau said in its July forecast, has averaged 5,870,000 bbl. daily for the first 4 months of 1947 compared with 5,248,000 bbl. daily for the same period of 1946—an increase of almost 12 per cent.

"Estimates of maximum possible sustained runs range between 5,000,000 and 5,100,000 bbl. daily, allowing for refineries that cannot operate at capacity due to location or difficulties in obtaining crude," the report said. "The most important current transportation problem relate to pipe-line capacity and avaliable tank cars to move crude and products into the North Central states."

In its breakdown of crude-oil demand by states, the bureau placed July demand for Texas crude oil at 2,190,000 bbl. daily, 35,000 bbl. daily over the June forecast; California, 900,000 bbl. daily, 16,000 bbl. daily over June; Louisiana, 425,000 bbl. daily, up 7,000 bbl. daily; Oklahoma, 390,000 bbl. daily, up 5,000 bbl. daily; and Kansas, 290,000 bbl. daily, up 10,000 bbl. daily.

Crude Increases Spread to Other Pennsylvania Grades

Strong demand for Pennsylvania Grade crude oil and the resulting keen competition for supplies among refiner-purchasers last week resulted in several additional price increases for this type crude oil.

Shortly after the action of South Penn Oil Co.'s Joseph Seep Purchasing Agency in boosting Bradford and Allegany district crudes 25 cents *(The Oil and Gas Journal, July 5, page 55)*, Waverly Oil Works, of Pittsburgh, announced a 15-cent-per-barrel increase for Pennsylvania Grade crude produced in West Virginia, southwestern Pennsylvania, and southeastern Ohio.

A few hours after Waverly's announcement, the Joseph Seep agency posted a 25-cent raise for the same crudes. Waverly promptly met this by revising its own increase to 25 cents.

When this round of raises was over, prices included: Zanesville, Ohio (Waverly only), $3.75; Buckeye, $4.05; Southwest District and Eureka, Pennsylvania Grade, $4.09. No increase was announced by the Joseph Seep agency for Corning grade in Buckeye pipe line. The postings were retroactive to July 1.

Texas to Offer Offshore Leases Despite Decision

AUSTIN.—The School Land Board will offer submerged land leases for sale November 4, notwithstanding the recent Supreme Court ruling in the California "tidelands" case, according to Bascom Giles, board chairman.

Giles said requests for lease purchases thus far indicate it will be the biggest sale ever held. Tracts of submerged tidelands in the Gulf to be offered for lease will be determined by requests. Leases in river beds, bays, and inland waterways also will be offered.

The Supreme Court held the so-called marginal sea off California's coast belongs to the federal Government.

International

WORLD-WIDE OIL DEVELOPMENTS

Projection Shows Heavy Gains in Foreign Products Demand

BY 1951 the total foreign demand, exclusive of Russia, for all principal petroleum products will have climbed to 2,363,000 bbl. daily, according to well-informed sources in New York. This compares with an estimated daily foreign demand for 1947 of 1,795,000 bbl.

All figures used here are exclusive of military demand and the principal petroleum products mentioned are gasoline, kerosine, fuel oils, and lubricants.

The 1951 estimated daily demand for the Western Hemisphere is estimated at 748,000 bbl. daily against 1,615,000 bbl. daily for the Eastern Hemisphere. In the Western Hemisphere it is estimated that the daily demand in North America, exclusive of the United States, will be 478,000 bbl. daily and in South America 270,000 bbl. daily.

In the Eastern Hemisphere it is estimated that in 1951, total daily demand will be broken down about as follows: Europe, exclusive of Russia, 992,000 bbl.; Africa, 152,000 bbl.; Asia, 392,000 bbl.; and Oceania, 79,000 bbl.

Daily foreign demand for gasoline in 1951 has been estimated at 810,000 bbl. of which 244,000 bbl. is earmarked for the Western Hemisphere against 566,000 bbl. for the Eastern Hemisphere. In South America the daily estimated demand for gasoline is set at 84,000 bbl. daily while Europe's figure is 392,000 bbl. daily.

The 1951 daily kerosine demand for the Western Hemisphere, exclusive of the United States, is estimated at 35,000 bbl. against 154,000 bbl. for the Eastern Hemisphere. Of the total in the Western Hemisphere, South America will take 18,000 bbl. daily. A total of 62,000 bbl. is estimated for Europe, and 61,000 bbl. for Asia.

Fuel-oil demand in 1951 has been estimated at 458,000 bbl. daily for the Western Hemisphere, exclusive of the United States, compared with 834,000 bbl. for the Eastern Hemisphere. South America's 1951 demand will be 164,000 bbl. daily compared with 498,000 bbl. for Europe and 247,000 bbl. for Asia.

As for lubricants, the 1951 estimated daily demand shows 11,000 bbl. for the Western Hemisphere, exclusive of the United States, of which 4,000 bbl. is for South America. Eastern Hemisphere demand for lubricants has been set at 61,000 bbl., of which 40,000 bbl. will be for Europe, and 13,000 for Asia.

According to preliminary estimates for 1947 on gasoline demand, the Western Hemisphere, exclusive of the United States, will consume 195,000 bbl. daily, of which 65,000 bbl. will be in South America. In the Eastern Hemisphere estimated gasoline demand for this year will be 416,000 bbl. of which 284,000 bbl. will be in Europe and 53,000 bbl. in Asia.

For fuel oils this year, the same source shows that the Western Hemisphere, exclusive of the United States, will consume 409,000 bbl. daily, of which 144,000 bbl. will be in South America. Fuel-oil demand in the Eastern Hemisphere will be 559,000 bbl., of which 286,000 bbl. will be in Europe and 206,000 bbl. in Asia.

Venezuelan Government to Open Bids For Royalty Oil August 18

A WORLD-WIDE tight crude market and the possibility of obtaining premiums has led the Venezuelan Government to decide to ask for bids for the purchase of up to 25 per cent of its royalty oil.

According to information from Caracas, the Ministry of Fomento will open sealed proposals on August 18. Offers may be received up to that time. Based on Venezuela's April production of 1,144,000 bbl. daily, 25 per cent of the government's one-sixth royalty oil would amount to approximately 47,500 bbl. daily.

The government has been considering taking its royalty in kind and offering it on the open market for more than a year. At present, producing companies holding concessions pay the government for its share of the production. Venezuela has never taken its royalty in kind.

The report from Caracas said the National Economic Council, which recommended the sale of the oil, had been encouraged by the success of the United States Government's sale of royalty oil. The reference was to recent bids for United States federal royalty oil which offered premiums above posted prices.

At the same time, it was disclosed in the Venezuelan capital that the Ministry of Fomento is studying two offers for its royalty oil. One involved a trade with Belgian interests of a quantity of Lagunillas royalty oil for 7,000 tons of asbestos cement valued at $739,250. The second was the proposal of an Italian company negotiating through the Venezuelan legation in Rome to buy some 56,000 bbl. of royalty oil.

The bids to be opened August 18 are for 25 per cent of the royalty oil for a 2-year period beginning January 1, 1948, a resolution promulgated by the government showed.

"The contracts may deal with all or part of the amount of oil at the disposal of the government in any receiving installation located in the section covered between the production field and the export terminal, ..." the resolution said. Money paid the government, it was stipulated, must be in Venezuelan currency.

Romanian Industry Continues To Be Russian Dominated

IN pointing out how the Romanian oil industry continues to be Russian dominated, a current issue of The Economist in London reports that in organizing the Russo-Romanian oil company, Sovrompetrol, the Soviet "so framed the valuation of the respective contributions to date that they claim a 70 per cent interest." And this despite the original Russian "offer" to establish an equally owned corporation.

In recent trade discussions in Moscow, the Russians raised new demands and consequently the Romanians have granted additional oil concessions and exploration rights as well as an exclusive claim to the country's royalty oil.

"In addition," the British publication explains, "the Romanian Government has promised: (1) To pay Sovrompetrol $4,000,000, over 50 per cent in free foreign currency, as compensation for loss of profits and inadequate depreciation resulting in 1945 and 1946 from the low prices fixed by the government; (2) that Russia's 70 per cent share in the company's profits may be remitted to the Soviet Union in dollars; (3) that the company may this year export 70,000 tons (about 500,000 bbl.) of petroleum products against payment in free exchange; and (4) that it may use the entire proceeds of a large proportion of its products to buy oilfield materials and equipment abroad."

Priviliges granted the Russians in Romania are not enjoyed by United States and British oil interests. "Not only have they been paid miserable prices for their products in lei," the Economist points out, "but their shareholders have received no return on their investments since 1940. Although critically short of materials required to stem the decline in their production, the companies have no prospect of importing them because they are not allowed to export any oil and therefore cannot obtain the foreign currency to pay for imported supplies.

"Hitherto, the Russians themselves have been subjected to these disabilities—as a natural consequence of their prevention of any worthwhile oil exports. Now, Sovrompetrol, by selling oil abroad and thus obtaining foreign currency, will be able to purchase the much-needed materials and supplies, and thereby to check and even reverse the decline in its own production, while production of the foreign companies is bound to fall further."

Montevideo Refinery to Double Capacity

EXPANSION of the 6,300-bbl. daily refinery of Administration Nacional de Combustibles, Alcohol y Portland, at Montevideo, Uruguay, to 13,000 bbl. daily is expected to be completed by the end of 1948. Foster Wheeler Corp. is handling the design and construction work.

The new refinery construction at Montevideo will be designed to run Venezuela's Oficina and Temblador crudes while existing equipment will be utilized largely to handle lighter crudes from Peru and Ecuador.

Ing. Ernesto S. Pelufo, superintendent of A.N.C.A.P., is now in the United States concluding the necessary contract with Foster Wheeler as well as making arrangements to purchase three tankers, two of which are the T2-SE-A1 type. The tankers were bought from the U. S. Maritime Commission. The smallest of the three will be used to transport products from A.N.C.A.P.'s Montevideo refinery to Paysandu where there is a packaging plant.

Ezequiel Perez Prins, manager of A.N.C.A.P., has also been in the United States in connection with the refinery expansion plans.

View of the existing refinery at Montevideo, Uruguay

International

WORLD-WIDE OIL DEVELOPMENTS

Situation in Guatemala Unchanged, Reports Indicate

Though a news dispatch from Guatemala said an independent United States company had been granted petroleum exploration rights there, reports from well-informed sources in New York stated that to their knowledge there had been no change in the current Guatemalan situation.

In short, the proposed petroleum legislation for Guatemala has not yet become law and even if it had, it would still be necessary for the Guatemalan Constitution to be altered before foreign companies would be allowed to participate in exploratory or development operations there. *(For a detailed discussion of the proposed law, see The Oil and Gas Journal, October 12, 1946, page 60).*

The news dispatch from Guatemala stated that Stapper Oil Co. of Houston, reportedly formed April 29 with a capitalization of $250,000, had been granted exploration rights in the Guatemalan districts of Alta Verapaz, Baja Verapaz, and the southeastern half of the Peten Basin, comprising approximately 2,000,000 acres.

Successful Completions in Peru Show Little Change

Total number of Peruvian oil and gas wells completed in 1946 was 96 compared with 95 in 1945, according to information received by the Office of International Trade, U. S. Department of Commerce. Last year saw 40 dry holes in Peru compared with 19 in the previous year.

As of December 31 there were 2,964 producing wells compared with 3,215 in 1945, the drop being largely accounted for by International Petroleum Co., Ltd., which abandoned many low-yield stripper wells following the end of the war as they were not commercially profitable.

In 1946 a total of 36 extensions and workovers were reported in contrast to none in 1945.

Exploration in Colombia Extends From The Caribbean to the Llanos

by Kenneth B. Barnes

AT the present time seven oil companies are stretched out on a widely spread distribution of exploratory wells in Colombia. Some of these rigs are in the northern territory near the Caribbean. Some are in the jungle country of the Middle Magdalena Valley. The rest in the vast llanos or plains area, south and east of Bogota.

Operators are Cia. de Petroleo Shell de Colombia, Colombian Gulf Oil Co., Socony-Vacuum Oil Co. of Colombia, Texas Petroleum Co., Tropical Oil Co., Colombian Petroleum Co. (Texas and Socony-Vacuum), and Companias Unidas de Petroleo (Sinclair, Cities Service, and Richfield)—as to active rigs. Other companies are also engaged in geological and concession work.

Total expenditures for the exploratory program in Colombia over the past few years have been very high, probably substantially exceeding $100,000,000. Some new fields have been touched and partially evaluated. Some structures have been found unproductive. In any case, more geological data and an understanding of oil-potential provinces are being built up.

Difficulties With Concessions

The present wildcatting status did not build up overnight nor on a short-term basis. The job was done laboriously. The obstacles of transportation and legalistic red tape and delays in securing properly titled concessions were two causes for the slow progress. Moving drilling equipment and supplies involved one or the other of cutting roads through jungle areas, river transportation, part-way railroad hauls, perhaps airborne movement. Sufficient experience has been gained, however, that "know-how" is now established for the various combinations of transportation and routes, and the rigs and supplies can and do get moved.

As to the time, trouble, and delays that in the past have characterized the obtainment of concessions, perhaps better times are ahead. The National Petroleum Council is now at work on a comprehensive change of the oil statutes and coincident regulatory decrees. Questionnaires have been sent to the oil companies, seeking information for guidance on this course, and as to past costs involved in geophysical and geological data, construction of roads, surveys for concessions, etc.

A map of active or fully titled concessions (a few are privately or fee owned) is included with this article. An oil concession in Colombia requires taking 10 different phases or approval clearances with the various government bodies. Several years usually have been required to get a concession fully titled, particularly so if allegations are made by individuals that the land involved has private claims against it, e.g., that it is not national or public property. If the forthcoming oil bill reduces the number of steps in obtaining concessions, as its makers are working on, expansion and an increased tempo in exploration should result. The following table shows "applications" made for concessions in past years; however, the map of actively titled ones reflects the delays and small number that have been finally authenticated:

APPLICATIONS FOR CONCESSIONS—COLOMBIA

Year—	No.	Area—hectares*
1931-36	21	758,902
1937	25	956,340
1938	19	812,914
1939	32	1,065,580
1940	8	502,035
1941	11	340,182
1942	13	647,367
1943	78	4,500,679
1944	123	8,556,218
1945	87	4,362,697
1946	62	3,642,407

*Hectare equals 2.471 acres.

This story gives the "who" and "where" of the current multimillion-dollar wildcatting program in Colombia. The play is distributed over virtually all the promising oil territory in the country. And on it, Colombia's rank—now No. 2 South American oil producer—will either firm up or gradually recede. In last week's issue, this writer, the engineering editor of The Oil and Gas Journal who recently returned from his trip to South American oil countries, described features of Colombia's three big producing fields, in the De Mares, Yondo, and Barco concessions, and associated refining and pipe-line activities.

There are three principal areas in Colombia which are being searched for prospective new oil reserves at the present time. These are the northern part of the country, Middle Magdalena Valley, and the llanos regions south and east of Bogota.

Northern Colombia

Active both in development and exploration drilling in northern Colombia are the Continental Shelf itself, the Caribbean area, and the Lower Magdalena Valley.

El Deficil.—Shell's El Deficil field is located about 50 miles southeast of Barranquilla. The limestone formation in the upper Oligocene at about 5,800 ft. is the producing horizon. The gravity of the crude oil runs 41° to 47° A.P.I., and to some extent acidization has been employed in completions. In the past, Shell has drilled six tests on its former San Angel concession to the north and two tests on the El Brillante to the south.

Currently 16 El Deficil is being deepened after acidizing and production tests at 5,828 ft. Here tests averaged 100 bbl. per day, choked, with a gas-oil ratio of 2,432, casing-head pressure of 850 psi. and tubing-head pressure of 200 psi. No. 17 is also testing deeper, drilling and coring below 7,125 ft. Under way for 2 years is a 20-well drilling program designed to define and prove the reserves of the field. Present potentiality is upwards 2,500 bbl. per day.

In the vicinity of Point Colombia west of Barranquilla, Shell also has been granted a permit by the Ministry of Petroleum for exploratory work on the Continental Shelf in sea waters.

Tubara.—Ten miles south of Point Colombia, on a 16,500-hectare operation (about 41,000 acres), Sinu Oil Co. (Tropical-Socony) now has No. 1 at 8,185 ft., total depth. The well is being perforated at 7,680-7,780 ft. and drill-stem tests are under way; operators are rigging up at No. 2 location.

La Granada.—Petroleos Ariguani, S.A., recently had a blowout and fire at its No. 1 test here. Seismographing on the block is reported to have indicated an anticline covering 2,500 hectares (about 6,200 acres). The well was drilling at 3,800 ft. when the blowout occurred. After burning and

This map shows the location of the active wildcatting areas in Colombia. Numbers on the exploratory concession blocks refer to those given in the first column in the table listed below. Shaded areas are chains of the Andes Mountains that are in excess of 6,000 ft. in elevation. Principal port of entry is Barranquilla, on the Caribbean at the mouth of the Magdalena River; Bogota, the capital, is in the central interior

LIST OF ACTIVE CONTRACTED CONCESSIONS IN COLOMBIA

Appli. No., concession and company—	Must be drilling	1st. well started
A De Mares, Troco		1916*
B Barco, Colpet		1920†
26 Yondo, Shell	March 15, 1941	March 12, 1941‡
28 L'Monas, Socony	August 8, 1946	March 19, 1946
34 Buenavista, Richmond	March 28, 1946	March 25, 1946
41 Cantagallo, Socony	June 16, 1942	April 15, 1941
46 Cg.d'Trapo, Gulf	June 13, 1947	
47 Floresanto, Socony	Oct. 10, 1944	May 25, 1944
51 L'Victoria, Regalias	Sept. 5, 1947	
53 Sn Martin, Shell	Feb. 10, 1944	Feb. 3, 1944
63 Voragine, Shell	Sept. 25, 1947	Moving in
73 El Petral, Socony	Feb. 16, 1946	Sept. 30, 1945
77 Corcona, Gulf	Nov. 18, 1947	
78 Zahino, Gulf	April 14, 1946	July 11, 1946
93 San Antonio, Troco	Nov. 23, 1948	April 25, 1947
96 Dificil, Shell	May 29, 1943	July 18, 1942
98 Caraballo, Richmond	August 9, 1946	Sept. 25, 1945
99 Macarena, Shell	Feb. 26, 1951	
108 Sardinata, Gulf	March 9, 1946	May 12, 1946
110 Pinto, Texas	May 24, 1947	May 9, 1947
122 Granada, Troco	May 24, 1947	April 12, 1947
124 Costa Rica, Troco	Dec. 15, 1947	Sept. 23, 1945
137 Munungte, Texas	Suspended	
138 Remolino, Texas	Jan. 12, 1949	Rigging up
140 L'Risa, Socony	August 21, 1947	
151 Tame, Socony	Suspended	
181 Tablon, Texas	August 28, 1947	Nov. 10, 1946
184 El Paso, Troco	Jan. 1, 1949	
216 Chaviva, Troco	Oct. 24, 1950	Dec. 29, 1946
218 Ags. Claras, Socony	Jan. 12, 1949	
224 Cimitarra, Shell	Not set	
231 Guachiria, Troco	Jan. 3, 1951	

Contract expires: *August 25, 1951; †August 25, 1981; ‡June 12, 1975.

International

also spraying salt water for 8 days, destroying the rig, the fire was extinguished by using a steam boiler.

Ariguani is a 50-50 venture between Colombian capital and Tropical Oil. The concern has had accepted four concessions totaling 165,503 hectares (about 410,000 acres) and four or more other concessions have been filed. Its first test was plugged last year (1 Costa Rica) at 10,609 ft. Reported total direct and indirect costs for that well were $928,000. The concern has capital of $4,275,000 and 2,241 shareholders.

Pinto, El Tablon, Remolino.—At Pinto, Texas Petroleum and Socony have started a deep test about 6 miles southwest of the 1 Granada test which blew out. The well is being drilled and cored below 3,430 ft. Some high-pressure gas shows and oil-stained drilling mud have been reported. A heavy-duty 12,000-ft.-plus rig is being used.

At El Tablon, a 49,981-hectare property (about 123,500 acres), 65 miles from Covenas, La Junta Petroleum Co. (Texas Petroleum) has drilled 9,934 ft., backed up to 7,999 ft., and sidetracked. Casing is set at 7,395 ft., and below that depth the well has blown 18,000,000 cu. ft. of gas per day. Total depth is now 7,874 ft., and testing is proceeding. Road is being constructed for another test on the block, 1 Jobo.

At Remolino is another Texas Petroleum test, 1 Buenavista, 40 km. (about 25 miles) southwest of Barranquilla. Camp site has been built and spudding will commerce shortly.

Floresanto.—Here Sinu Oil Co. (Tropical and Socony) on a 67,000-acre concession near Monteria have drilled nine shallow tests to outline a steeply pitched, tightly folded anticline. Two 75-bbl., 40°-gravity producers have been obtained; one is at 650 ft., the other at 1,200 ft. Pay formation is 25 ft. of middle Miocene sands. One test on the structure drilled to 6,936 ft., with much trouble being encountered by heaving shales. Deep oil possibilities are now being more fully explored, with No. 10 test using a starch-base mud to assist in getting the hole down to 10,296 ft. Seven-inch casing has been set, the mud is being conditioned, and 3½-in. drill pipe on the way preparatory to going deeper.

San Andres.—On its fee block 2 miles east of San Andres, Companas Unidas de Petroleo, S.A., has rigged up for No. 1 test. The concern is a joint venture of Sinclair, Cities Service, and Richfield, and has holdings of some 131,752 acres in the department of Bolivar 25 miles from the Caribbean port of Covenas. Appli-

cations have been made for 14 other concessions in the western seaboard area.

Middle Magdalena Valley

Sardinata, Zahino.—On the west bank of the Magdalena River and immediately south of Shell's Casabe field, Gulf Oil has its Sardinata and Zahino concessions. The second Sardinata test is drilling and coring at 7,555 ft. No. 1 Sardinata went to 8,250 ft., plugged back to 2,026 ft. for testing, and was completed for a shallow water-supply well. On the Zahino concession, No. 1 test this year drilled and cored to 6,737 ft., total depth; No. 2 is now drilling at 2,735 ft.

Las Monas.—Directly north of Tropical's Da Mares concession, some 30 miles east and 12 miles south of Puerto Wilches, Socony-Vacuum has the La Salina and adjoining Aguas Claras concessions totaling 71,000 acres. La Salina 1, in 1946 was completed between 1,770-2,230 ft. in Eocene sand intervals for 75 bbl. per day at 21°-gravity crude. La Salina 2 drilled to 3,495 ft. and was completed for 80 bbl. per day. Now drilling below 5,310 ft. is 3 La Salina.

The La Salina operations are operated from a camp at Aguas Claras, with a supervisory office at Cantagallo. First production on the property started 21 years ago when South American Gulf Oil Co. completed a 120-bbl. flowing well at 904 ft.; the second was drilled to 4,775 ft. and was a failure. After acquisition at the time of the Barco purchase in 1937 other tests were drilled by Socony-Vacuum.

Cantagallo.—Unusual geologic features are present at this concession of Cia. de Petroleo del Valle del Magdalena (Socony) 15 miles north of Casabe, in the Rio Cimitarra region. Formational conditions are highly fractured and complex. Twelve wells have been completed, three are fair and two are small producers, and there are two gas wells and five dry holes (total footage was 64,211). Ten structural-core test holes were drilled in 1946 and 12 in 1945 (total footage, 22,183). Potential production has been reported to be on the order of 2,000 bbl. per day. No. 11 well is drilling at 7,390 ft.

Teran - Guaquaqui. — On this fee property south of Buenavista, originally purchased back in 1929, Texas Petroleum Co. in 1946 completed 1 Velasquez. Reported initial production was 421 bbl. per day of 27.4° crude, choked. Total depth reached was 8,455 ft., 5 ft. into the granite basement. Total time in drilling was 356 days. Production is from perforations at 6,945-7,120 ft. No. 2 now is drilling at 7,530 ft., with 7⅝-in. casing set at 6,395 ft.; No. 3 is rigging up.

The company has a field camp for the operations, with 15 km. (about 9.3 miles) of road leading from the sites to Puerto Nino on the Magdalena River. The company also owns 15,000 acres in fee elsewhere in the department and has leased from private owners 35,000 acres in southern Tolima, and has other interests. An active wildcatting program is to be undertaken this year in the lower valley and also in the southwest llanos area, with three rigs eventually in use besides the one on development work on the Teran-Guaquaqui fee property.

Other concessions and tests.—Socony-Vacuum has drilled two wells on the Narino structure to 6,516 ft. and 10,740 ft., a dry hole in the Oligocene on the Peralonzo structure to 9,274 ft., total depth, and McCarthy No. 1 to 5,600 ft. A few wells also have been drilled in the upper Magdalena Valley and have obtained small showings but no commercial production. The area is characterized by complex faulting and folding; there are oil seepages in crests or folds and along fault lines.

On the east side of the Magdalena Valley and south of De Mares, Sociedad Nacional del Carare, southeast of Puerto Berrito drilled two noncommercial tests. San Fernando 2 on an anticlinal structure, went to 9,272 ft. in the La Paz Eocene and had some showings. Shell drilled two tests on the Monto Oscuro faulted anticline, No. 1 ending in the La Cira formation at 9,103 ft. and No. 2 in the Miocene at 3,016 ft. In the vicinity of Rio Ermitano Shell has drilled three tests, one to basement at 7,447 ft. North and east of De Mares, 11 tests have been drilled on the La Tigre faulted and overthrust anticline but without commercial success.

Llanos Country

In the vast llanos region in southeastern Colombia — the large-scale hunting ground for future oil reserves in the country—Shell interests have drilled a number of exploratory tests. At Chafurray, five test holes have been completed, the first starting in March 1945. Total depths ranged from 1,745 to 2,340 ft. Each was reported to have ecountered the metamorphic basement.

On Shell's San Martin concession, the first test was shallow, the second was abandoned at 6,815 ft. after testing 14°-gravity heavy-oil shows. No. 3 recently reached 5,991 ft. total depth and is being abandoned. No. 4 is drilling at 2,060 ft. Preparations are being made for the first test of the Voragine concession. All of the aforegoing are located in the Department of Meta.

Tropical Oil started its first test in the llanos, on the Chaviva concession, on December 29 of last year. The hole is reported to be projected for possibly 15,000 ft. Currently 1 Chaviva is drilling below 7,675 ft. The company also has the Guachiria concession in the llanos.

Decline Indicated for High Venezuelan Output Rate

Total Venezuelan crude-oil production for the first 4 months of this year was 13.8 per cent above the same period in 1946, according to statistics gathered by the U. S. Commerce Department's Office of Interational Trade.

However, Venezuela's output of 1,107,016 bbl. daily for the first 3 weeks in May and of 1,143,457 bbl. daily in April, indicated a decline compared with the high output reached during February and March. Venezuela's total April production of 34,303,723 bbl. was 1,652,911 bbl. below the March output.

Petroleum-industry statistics for the January-April periods of 1946 and 1947 are shown in the accompanying table.

	January-April 1946	January-April 1947
Crude production by leading companies:		
Creole	66,022,633	74,350,920
Venezuelan Oil Concessions	23,793,271	28,510,866
Mene Grande	18,709,266	20,413,968
Caribbean Petroleum	5,132,388	7,121,871
Consolidada de Petroleo	3,638,606	2,630,276
Socony-Vacuum	1,961,964	3,107,273
Total	121,864,441	138,730,894
Crude stocks	8,216,533	10,963,916
Crude refined	11,190,042	10,641,258
Crude exports	111,046,352	128,201,144
Products exports	8,914,232	7,667,510

Bolivian Mixed-Company Program Termed Failure

Adoption of a new policy which would attract foreign capital to develop Bolivia's petroleum reserves, was advocated by Rene Ballivian shortly before he resigned as president of Yacimientos Petroliferos Fiscales Bolivianos (Bolivian Government Oil Fields).

Ballivian declared that the Bolivia mixed-company program has failed. At present, the Bolivian Congress is studying proposed legislation which would permit limited participation of foreign oil companies in the exploration and development of that country's crude-oil reserves.

Meanwhile, the proposed contract between Superior Oil Co. and Y.P.F.B. has been subjected to such widespread criticism in Bolivia's press and in the Bolivian Senate that its approval by the latter (at least in its present form) is considered unlikely.

Superior's contract provides for exploratory and development work to be carried on in exchange for a share of any oil discovered. The contract is not a concession in the usual sense of the term.

Industry's Current Operating Level Promises Improved Supply

by John W. Boatwright

THE demand for United States petroleum products for the year ending December 31, 1947, will approximate 5,700,000 bbl. daily. This includes approximately 400,000 bbl. daily for export. Total demand will be approximately 380,000 bbl. daily greater than was experienced in 1946.

To meet this, the industry will have to produce crude oil and operate its refineries at a level of approximately 5,000,000 bbl. daily. The supply part of requirements will be made up of approximately 450,000-480,000 bbl. per day of imports of crude and products, 355,000 bbl. per day of natural gasoline and condensate, and the remainder of approximately 5,000,000 bbl. per day will come from domestic production of crude oil.

The industry has reached and is exceeding a domestic production rate in excess of 5,000,000 bbl. per day. Imports for the year should average in the range indicated or slightly better than 450,000 bbl. per day. Output of natural gasoline and condensate of 355,000 bbl. per day was reached during February. Some additional crude oil could be produced in the West Texas area if transportation facilities were available for movement to a market.

I believe the estimates of probable sources of supply are reasonable and that the industry on a national basis is not faced with a shortage of basic raw materials.

The industry has adequate refining capacity to convert crude oil into finished products. The best estimate of current refinery capacity would be approximately 5,500,000 bbl. per day. If the distribution of refinery capacity and the availability of crude-oil supplies were in keeping with the distribution of consumption, there would probably be little question about the industry's ability to meet requirements. No such ideal condition exists. There are two serious problems confronting the industry. The first is the absence of adequate transportation facilities to move crude and products to their respective markets. Pipe lines into all probable shortage areas have been maintained at or near capacity for some time. Greater dependency will have to be placed on tank cars, truck transports, barges and coastal tankers than was experienced in 1946. The second major threat is loss of effective refinery capacity because of plant shutdowns. During the first 6 months of 1947, the country lost approximately 15,000,000 bbl. of crude running capacity because of work stoppages.

John W. Boatwright is manager of the sales-research department of Standard Oil Co. (Ind.). This statement was presented by Boatwright July 1 in Washington before the House interstate commerce committee during its investigation of petroleum supply problems. In the opening paragraph (not included here) Boatwright explained his remarks were intended as a broad summary of national supply and demand and that some of his discussion was predicated upon work done as a member of the economics advisory committee to the Interstate Oil Compact Commission. For other information on the congressional investigations of petroleum supply, see page 37.

Supply Improvement Seen

The oil industry has undertaken many costly and emergency steps to bring together crude supplies and refining capacity. Pipe lines are crowded to capacity. Tank-car movements of crude oil in large quantities for tremendous distances have been undertaken. Marginal or submarginal refining units have been placed in operation. Tankers and barges are operated at capacity as the industry has sought to bridge the gap between sources of supply and shortage areas. These steps have made possible crude runs at refineries in excess of 5,000,000 bbl. per day during recent weeks. If the current rate of operation can be maintained and if demand takes the pattern foreseen, the supply of refined petroleum products should show evidence of improving in the near future.

This discussion assumes that there will be no phenomenal increase of fuel demand thrown on the oil industry by serious shortages of other fuels such as coal and natural gas. Obviously a prolonged coal strike would invalidate all calculations made on probable future demand for petroleum.

Now let us consider briefly the situation in the Midwest. I refer to that section of the country previously encompassed in PAW District 2, from Tennessee and Oklahoma on the south, and from the western border of Pennsylvania to the Rocky Mountains. This is the most serious probable shortage area in the country. I shall try to catalogue briefly the causes which have given rise to this problem.

1. Local production of crude oil in the Midwest in the closing months of 1941 exceeded 1,200,000 bbl. daily. At the present time, production in these same states is approximately 950,000 bbl. per day. Therefore, to meet the same market requirements today would necessitate transporting into the area 250,000 bbl. per day from other crude producing regions.

War-Construction Pattern

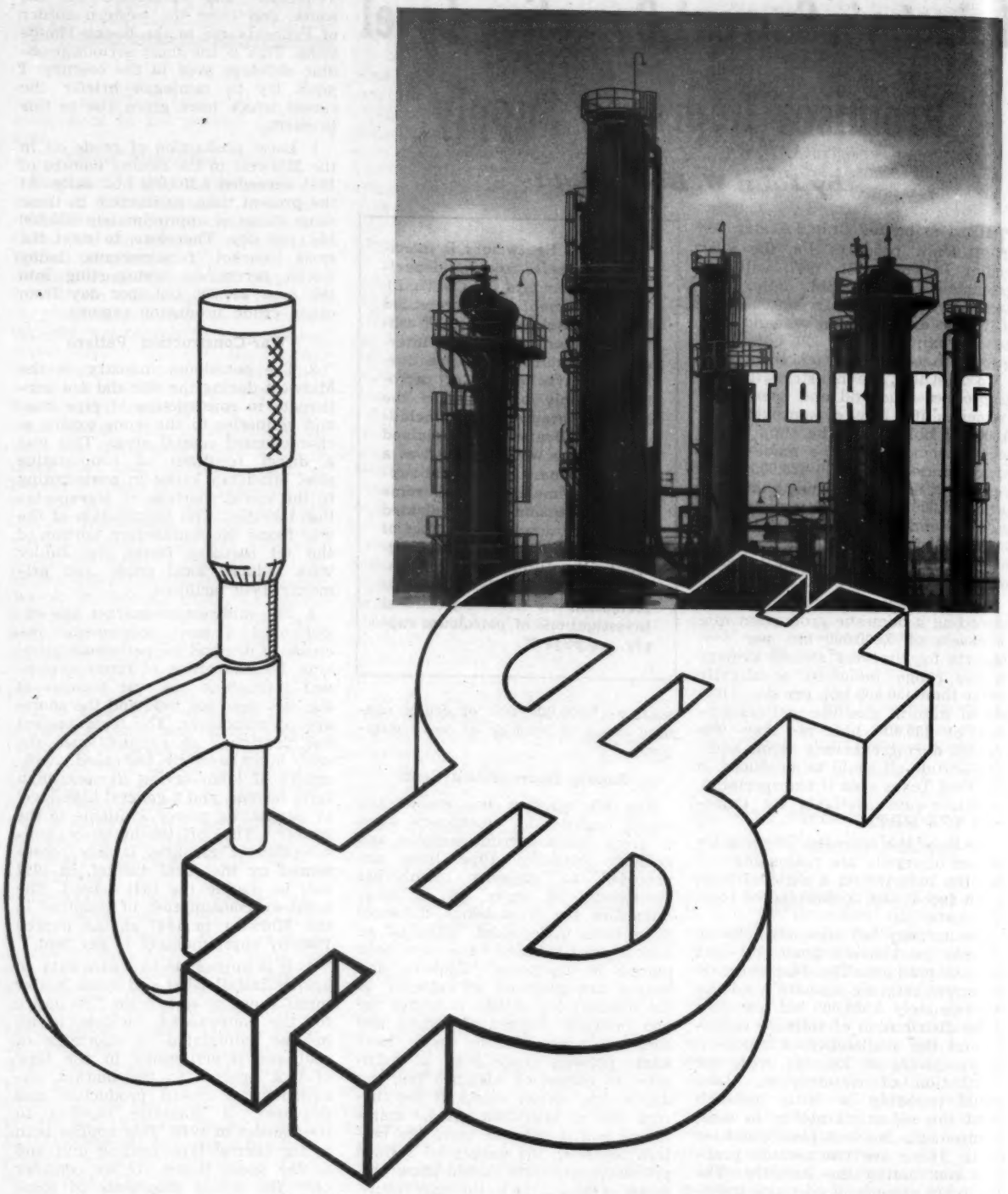
2. The petroleum industry in the Midwest during the war did not participate in construction of pipe lines and refineries to the same extent as characterized coastal areas. This was a direct resultant of comparative steel efficiency ratios in contributing to the world shortage of transportation facilities. The termination of the war found the midwestern portion of the oil industry facing the future with reduced local crude and primarily 1940 facilities.

3. The midwestern market has experienced a most phenomenal increase of demand for petroleum products. Mechanization of farms continued throughout the war because of the dire need for food and the shortage of manpower. The farm market has continued to expand since the war, stimulated by increased availability of labor-saving devices, high farm income, and a general high level of purchasing power available to the farmer. The off-the-highway consumption of gasoline, largely represented by the rural market, in 1947 will be double the 1941 record. The highway consumption of gasoline in the Midwest in 1947 should exceed 1941 by approximately 14 per cent.

4. It is impossible to secure data on burner installations and space heater installations by state areas. The desire for the convenience incident to oil heating, stimulated by shortages of coal and interruptions in the flow of that product to the market, resulted in a record production and shipment of domestic burners to the market in 1946. This applies both to the central-type heating unit and to the space heater. If we consider only the actual shipments of these two types of burners to the market, plus unfilled orders on the books at the end of 1946, this factor will have added 329,000 bbl. per day to national demand for petroleum products. It is my belief that expansion of this type of consumption unit was substantially greater in the Midwest than was experienced on a national basis.

5. Dieselization of railroads received its first impetus in midwestern areas. This means of power became

(Continued on page 132)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WASHINGTON WATCHING

BY HENRY D. RALPH

Defining the Treaty

WASHINGTON.—The Anglo-American petroleum treaty has cleared a big hurdle in obtaining the approval of the Senate foreign relations committee but ratification is not likely to be achieved at this session because of the Senate's crowded calendar.

Moreover, the committee recommended reservations and amendments which will require acceptance by the British Government, involving more delay before the pact could come into effect. These changes are all designed to make the treaty say what its negotiators insist they meant and to quiet fears of the United States industry that it might give the federal Government or the International Petroleum Commission some power over the conduct of oil operations in this country.

Opponents still profess to see ways in which the language might be twisted or evaded but the majority of the Senate committee apparently had little patience with such strained interpretations. However, the committee was sympathetic with legitimate fears of domestic producers and went to considerable lengths to offset them. If words mean anything, it is hard to see how the amendments can fail to achieve their objective.

Reservations Adopted

The committee adopted all three of the reservations offered by the American Petroleum Institute, with additional strengthening language. Where the A.P.I. stipulated that the treaty would not give additional powers to Congress, the committee added "or any department or agency" of the United States, and also that the treaty will not limit the delegated powers of Congress nor the reserved powers of the states. Where A.P.I. stated that the international commission shall have no authority over the foreign operations of American nationals, the committee added "or in any manner regulate or control the domestic oil industry" and also applied these limitations to any agency which might be set up under the United Nations Organization.

The two textual amendments offered during the hearings by Chairman Vandenberg were adopted by the committee. One of these applies to Article VII, Paragraph (b), which already states that the agreement shall not impair the right to regulate imports, by adding "or implying any commitment of any kind, not so to act, as either government in its discretion may see fit for the purpose of giving adequate protection to its domestic industry."

The other amends the controversial Article II, the only one which applies to the domestic oil industry of either country. This now binds the parties to respect valid concessions and to apply the principle of equal opportunity in acquisition of exploration and development rights, and then Paragraph (c) says: "that the exploration for and development of petroleum resources, the construction and operation of refineries and other facilities, and the distribution of petroleum, shall not be hampered by restrictions inconsistent with the purposes of this agreement." Since many witnesses questioned the true purposes of the treaty, Vendenberg proposed to delete the last four words and substitute "provisions of subsections (a) and (b) of Article II."

This amendment makes the treaty apply internationally only to respect for contracts and equal opportunity for British companies to do business in the United States.

A New Rizley Bill

A REVISED Rizley bill to amend the Natural Gas Act has been given the approval of the House leadership for early action, and the measure was tentatively set for debate late this week.

The revision omits some of the more controversial sections of the original and adds two new provisions, but its essential features are the same as the original. It was reintroduced by Rep. Ross Rizley of Oklahoma under a new number (H. R. 4051) so that the House could act on a "clean" bill without committee amendments —a parliamentary maneuver to speed passage and reduce the opportunities for opponents to obstruct debate.

The most important deletion was a phrase to prohibit the Federal Power Commission from restricting the sale of gas for any lawful purpose. This was designed to stop application of the "end use theory," and met considerable objection from coal interests. It was dropped not because the House interstate commerce committee endorsed end-use control but because the natural-gas industry conceded that FPC has never actually prohibited the sale of gas for an alleged "inferior" use in a final and binding order. It was felt that elimination of this provision would speed passage of the remainder and that Congress can consider another amendment to the law if FPC should later attempt end-use control.

Also dropped was a section designed to force FPC to act more quickly in granting certificates for construction of new pipe lines, requiring FPC to set cases for hearing within 60 days and to grant certificates without a hearing if no objections are filed within 30 days. State commissions and municipalities violently objected that this would deny them an opportunity to intervene. The commission has recently revised its procedure to conform with the Administration Practices Act, and it was felt that this section is not necessary at this time.

One of the new sections was added to meet the requests of many state commisssions and municipalities. It states that it is the duty of every natural-gas company furnishing gas to a public-utility distributing company to supply reasonable service to permit the distributor to meet its obligations to the public, and gives FPC power to require a transmission company to perform this obligation and to install such service instrumentalities as shall be reasonably necessary. The committee did not, however, adopt another amendment requested by the National Association of Railroad and Utilities Commissioners which would have prohibited direct industrial sales where such sales would impair deliveries to distributing companies.

Puzzling New Section

The other new section is something of a puzzle. It amends the Interstate Commerce Act to permit the construction of common-carrier natural-gas lines by persons engaged solely in the transportation of natural gas for hire and not in selling gas. Such lines would be exempt from regulation by FPC, and while they would be under the nominal jurisdiction of the Interstate Commerce Commission the ICC would have no regulatory powers over them. Apparently this would open the way for a transmission company to escape regulation by divorcing itself of all production and distribution and engaging solely in the transportation of gas for others.

Other provisions of the original Rizley bill are unchanged except for technical improvements in legal wording. It denies FPC jurisdiction over production, gathering, or processing of gas, whether done by a transmission company or an independent, and also over sales prior to interstate transmission and over local

distribution. The original definitions of all these terms are incorporated into the revised draft. The new bill also requires FPC to use the field price of gas rather than an investment-cost formula in fixing rates, and requires segregation for accounting purposes of property not subject to FPC jurisdiction.

The revised Rizley bill thus contains the chief amendments desired by the natural-gas and petroleum industry and goes quite a distance in meeting objections from others. The FPC, however, is still opposing action prior to its final report on its natural-gas investigation. In a long letter to the committee, Chairman Nelson Lee Smith picked many flaws in the revised draft and concluded that it would create uncertainties and confusion, requiring much litigation to settle, as well as leaving a large "twilight zone" or "regulatory gap" where neither federal nor state governments could exert any control over important segments of the natural-gas industry.

"Grandfather Rights"

THE fight over what rights a natural-gas pipe line has to be free from competition is again headed to the federal courts. Panhandle Eastern Pipe Line Co. has filed a second petition with the Court of Appeals for an order setting aside the action of the Federal Power Commission in granting a construction certificate to Michigan-Wisconsin Pipe Line Co. to enter the Detroit market.

The first petition was nullified last winter when FPC argued that it was premature on the ground that Panhandle should first ask the commission for a rehearing within 30 days after its opinion was filed. Because Commissioner Sachse was very ill and the other four commissioners were evenly divided, the opinion was not filed for many weeks after the certificate had been granted. Then Sachse resigned and the evenly-divided commission was unable to act on Panhandle's demand for reconsideration.

Panhandle contends that since it was serving Detroit before the Natural Gas Act was passed, its "grandfather certificate" entitles it to exclusive rights to serve that market, and that FPC has no authority to permit another transmission line to enter the territory. This is a legal question of considerable importance to most other natural-gas transmission lines.

The appeal to the courts also involves questions of procedure before FPC, since Panhandle contends that the commission acted in an arbitrary and capricious manner and before hearing all pertinent testimony. Back of the case also is a long fight between Panhandle and its Detroit distributor, Michigan Consolidated Gas Co., which is backing the "Mich-Wis" line.

Synthetic-Fuels Program

MORE time and money for the synthetic-fuels project of the Bureau of Mines are provided in a bill favorably reported by the House public lands committee and awaiting further congressional action.

The program was launched in 1944 with an authorization of $30,000,000 to be spent in 5 years. The new bill would increase the funds to $60,000,000 and permit it to continue for a total of 8 years. The main reason given by the committee is that the war-delayed construction and research work and increased salaries and material costs by 30 per cent or more. It also stated that the increase in petroleum consumption above the discovery rate makes it more necessary than ever that this country be in position to produce synthetic liquid fuels if necessary.

In support of the legislation the Bureau of Mines said that increased time is now necessary because it has been discovered that European synthetic-fuels processes were not as advanced as had been supposed and are not generally applicable to American conditions, so it is necessary to do additional basic research and to design new processes and pilot plants. The German method of generating hydrogen gas, it was explained, is very inefficient and an entirely new method is being developed. These new processes, the bureau said, indicate a considerably lower cost for liquid fuels from coal and shale than was estimated when the research program started.

Refining-Industry Trends

THE United States refining industry will have to add at least 250,000 bbl. of refining capacity during the next couple of years in order to keep up with the growing demand, the Department of Commerce concluded as it sent to press a detailed study of "Petroleum Refining Capacity, War and Postwar."

Refining capacity increased during the war from 4,700,000 bbl. per day in 1940 to more than 5,400,000 bbl. as of last October, and allowing for new capacity added since, operations ahead of rated capacity, and some 300,000 bbl. per day of natural gasoline, the department estimates the current capacity at just about the 5,700,000 bbl. daily estimated by the Bureau of Mines as the 1947 demand level.

By 1950 the demand will approximate 6,000,000 bbl. daily, the study says, but in the meantime refiners must make important decisions based on such factors as the relative yield of various products, growing demand for fuel oils and middle distillates, development of jet-propulsion fuels, and possible introduction of synthetic oil from coal.

The study, which may not be ready for distribution for several weeks, contains many large statistical tables giving detailed information on United States refineries by capacities, types of equipment, location, and ownership. *(For another report on refinery capacity, see page 38.)*

Leasing "Acquired Lands"

THE public lands committees of both House and Senate have given favorable reports to legislation to confer on the Department of the Interior authority to lease "acquired lands" for oil, gas, and other minerals under the general leasing laws applicable to the public domain.

Such lands have been acquired by the federal Government in many different ways and are administered by several departments for various purposes. Most of them have not been subject to leasing under any statute, a fact which frequently prevented an oil operator from assembling a block of leases to start exploratory operations. The proposed legislation would not disturb the surface use or ownership but would permit Interior to lease them in the same way it leases the public domain proper.

The Department of Agriculture has opposed both bills on the ground that its own system of oil and gas leasing is preferable. The Agriculture Department has always insisted on competitive bidding, while Interior's law calls for a straight royalty.

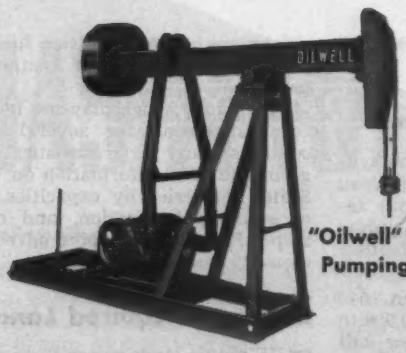
Although the bills were reported before the Supreme Court decided the tidelands case, the House committee stated that its bill does not and should not apply to any submerged lands since these would not fall within its definition of "acquired lands."

Freight Rate Increase

INCREASED freight rates and charges averaging 16 per cent for the nation as a whole have been asked of the Interstate Commerce Commission by all the railroads of the United States.

On petroleum and petroleum products the increase would be limited to 6 cents per 100 lb., and various other commodities would have specific freight increases instead of a percentage rise. The roads also ask increases in various accessorial charges such as switching; diversion, and reconsignment.

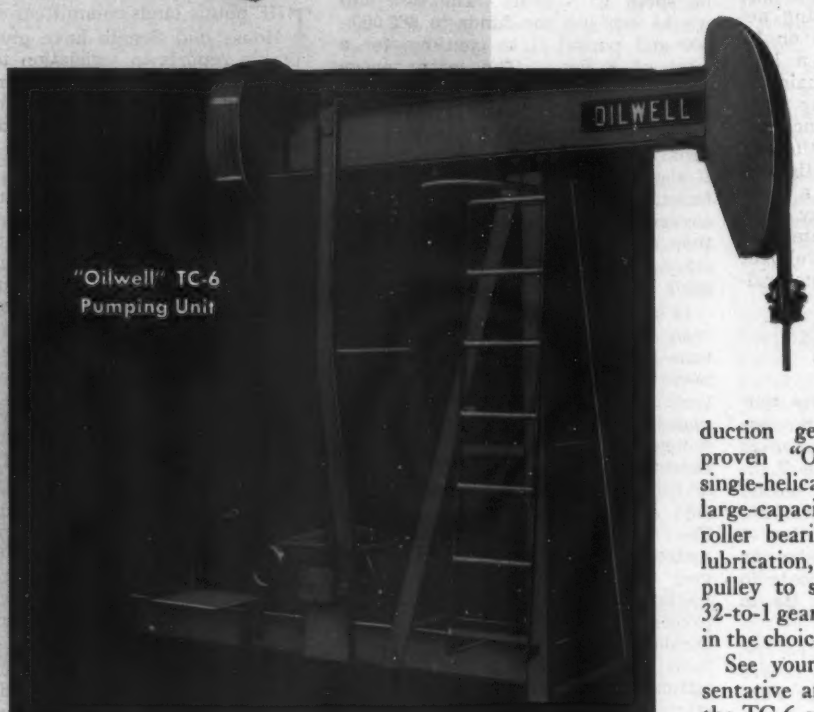
The petition declared that increased revenues are imperative to bridge the gap between present income and increased costs already in effect, and would not be sufficient to cover further increases in wages, fuel costs, and materials prices which may be expected in the near future.



"Oilwell" TC-5C
Pumping Unit

"Oilwells" NEW TC-6

Adds another size to complete an outstanding line of Light-Duty Pumping Units



"Oilwell" TC-6
Pumping Unit

THE new "Oilwell" TC-6 Pumping Unit is designed for economical pumping of shallow wells and for deeper wells equipped with small-diameter pumps. Reduction-gear case of fabricated steel is built integral with the frame. The reduction gear incorporates all the proven "Oilwell" design features: single-helical gears, shafts mounted in large-capacity shim-adjusted tapered-roller bearings, constant and ample lubrication, and flywheel-type V-belt pulley to smooth-out torque peaks. 32-to-1 gear ratio permits a wide range in the choice of prime movers.

See your nearest "Oilwell" representative and let him show you how the TC-6 cuts pumping costs.

"Oilwell" TC-8B
Pumping Unit

SPECIFICATIONS

	A.P.I. Peak-Torque Capacity at 20 S.P.M. Inch-Pounds	A.P.I. Polished-Rod Load Capacity Pounds	Stroke-Range, Inches
TC-5C	22,800	5,100	16 to 24
TC-6	30,900	6,900	20¾ to 30
TC-8B	42,200	9,500	22½ to 34

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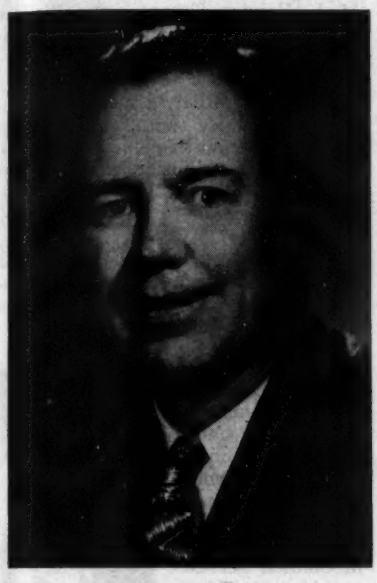
PERSONALS



Varied Career Back of La Gloria's New Head

JOHN F. LYNCH, new president of La Gloria Corp., Corpus Christi, Tex., at the age of 35 has had a varied and busy career in many phases of the oil industry.

At present, as well as being president of La Gloria, he is a director of Carthage Hydrocol, Inc., of New York, which is building a plant near Brownsville, Tex., for the conversion of natural gas into liquid hydrocarbons. La Gloria Corp. is a stockholder in Carthage Hydrocol. Lynch is president of Reynosa Pipe Line Co., Corpus Christi.

Lynch was born at Catawissa, Mo., and attended Washington University in St. Louis. His first oil-company experience was as a roustabout with Shamrock Oil & Gas Corp., Amarillo. He was with Shamrock 9 years, working in the production, natural-gasoline, and refining departments before becoming assistant superintendent of operations. In this capacity, he took an active part in the operation of modern refining processes, natural-gasoline manufacture, drilling, and production.

In 1939, Lynch left Shamrock to join the Fletcher Oil Co., Los Angeles, as refinery superintendent. In 1942, he was made manager of Fletcher's California operations including refining and marketing. During the war he was active in various oil-industry committees.

In 1944, he joined La Gloria Corp. to take charge of gas-cycling operations at the beginning of a program of expansion and new construction. He was made a vice president in 1946. and succeeded the late Robert T. Wilson as president early this year.

Francois Emmanuelli, president and general manager of Societe Nationale de Material pour la Recherche et l'Exploitation du Petrole (S. N. Marep), arrived in New York recently from Paris. He plans to visit California and Texas before returning to France.

Condon Mac Kay has been appointed manager, public relations department, Carter Oil Co., effective July 1. He succeeds **C. D. Watson** who will devote his time to representing Carter at Government hearings and industry conferences.

Rush Greenslade, Tulsa, vice president of Gulf Oil Corp., accompanied by **Dr. J. L. Peters,** chief geophysicist, Pittsburgh, and **P. H. Bohart,** assistant to the vice president, **P. H. Reisher,** chief geologist, and **E. D. Loughney,** head of the accounting department, all of Tulsa, recently toured Alberta, Canada, oil operations and properties in which the company is interested.

T. A. Boyd, head of fuel department, research laboratories division, General Motors Corp., has been elected 1947-48 president of the American Society for Testing Materials. **Arno C. Fieldner,** chief, fuels and explosives service, U. S. Bureau of Mines, has been awarded an honorary membership in A.S.T.M.

B. C. Price has been appointed vice president in charge of manufacturing of Swan-Finch Oil Corp., New York. **Walter W. Brey,** formerly controller, has been promoted to treasurer.

Clark S. Teitsworth, chairman of the manufacturing committee of Socony-Vacuum Oil Co., Inc., has been elected to membership on the board of directors. He will continue to supervise all phases of the company's refining and research.

Frank F. Griffin, storekeeper for Cities Service Oil Co. at Seminole, Okla., has been transferred to East Chicago, Ind., on a temporary assignment handling the checking and distribution of materials in the East Chicago refinery expansion program.

William L. Hobro, Shell Oil Co., Inc., has been elected chairman of the Conservation Committee of California Oil Producers. Other officers are: Secretary, **R. A. Holman,** Amerada Petroleum Corp., representing the Coalinga East district; first vice chairman, **T. H. Sherman,** of Huntington State Co., representing the Huntington Beach district; and second vice chairman, **H. S. Stark,** of Honolulu Oil Corp., representing Buena Vista Hills and Elk Hills.

Bill Finch, Shell Oil Co., Inc., has been elected president of the Rocky Mountain Oil Scouts to succeed

Members of the Kentucky Oil and Gas Association reelected officers of the organization at their recent annual meeting in French Lick, Ind. Shown above are: rear row—M. G. Powers, Huntington, W. Va., vice president; J. G. Preston, Owensboro, Ky., executive secretary-treasurer; front—Karl Z. Wilking, Owensboro, vice president; M. A. Arvin, Owensboro, president; and P. G. VanGilst, Ashland, Ky., vice president. Not shown is E. L. McDonald, Lexington, Ky., secretary

PERSONALS

Stewart McChesney. Elmo Moore, Pacific Western Oil Co., has been elected vice president, and **Jack Swafford,** British-American Oil Producing Co., secretary-treasurer.

Lee N. Haugen, manager of the East Chicago, Ind., refinery of Cities Service Oil Co., has been named to succeed **F. M. Simpson,** general superintendent of refineries, at Bartlesville, Okla. Simpson is being transferred to New York on special assignment. **John D. Snakenberg** will become acting plant manager at East Chicago.

Wayne Felts, former Phillips Petroleum Co. geologist, is now directing exploratory work in Utah and Nevada for The Texas Co.

Delman Guinn, former district geologist at Wichita Falls, Tex., has been named development geologist for Cities Service Oil Co. at Bartlesville succeeding **H. Travis Brown,** who has resigned to join Geolograph Co. in Oklahoma City. **Phillip D. Larson,** West Texas-New Mexico area district geologist for Cities Service, has been shifted to Wichita Falls to take charge of an enlarged office there which will also work the North and West-Central Texas areas. **L. E. Patterson,** previously in charge of the development section, Midland, Tex., is now district chief. **C. M. Pederson** and **C. W. Sellon** have been placed in charge of the development department.

Ira A. Brinkerhoff, formerly geologist for Stanolind Oil & Gas Co., Fort Worth, has joined Cummins, Berger & Pishny, and will head their recently opened consulting office in Houston. **V. R. Kerr** has joined the Fort Worth offices of the firm as seismologist. He was formerly with Cities Service Oil Co., in the same capacity.

Glenn H. McCarthy, Houston independent oil operator, will start publication of a weekly newspaper, the Southwestern Citizen, on July 18 in the southwestern Houston area. McCarthy has previously bought five neighborhood papers in Houston.

Roy W. Faulks, assistant superintendent of cracking, topping, and dispatching at the Houston refinery of Shell Oil Co., Inc., has taken over the responsibilities of the refinery gas department as a result of the departure of **A. H. Garrison,** formerly assistant superintendent at the refinery, who is now assistant superintendent at Shell's Wood River (Ill.) refinery in charge of the gas, alkylation, and cracking departments.

A. C. Hogge, chief research chemist at the Shell Oil Co., Inc., Houston refinery, has become research director in the research laboratory. The move was occasioned by the transfer of **H. R. Kemmerer** to Shell's Wood River (Ill.) refinery to be manager of the products-application department. **E. Gelus,** assistant chief research chemist, has been made chief research chemist succeeding Hogge.

Dr. J. S. Stewart, of the Geological Survey of Canada, who has specialized for many years past in western oil geology, is heading a party this summer to cover the new Leduc field and possible extensions. The party will later visit Hay River and Fort Norman in the Northwest Territories.

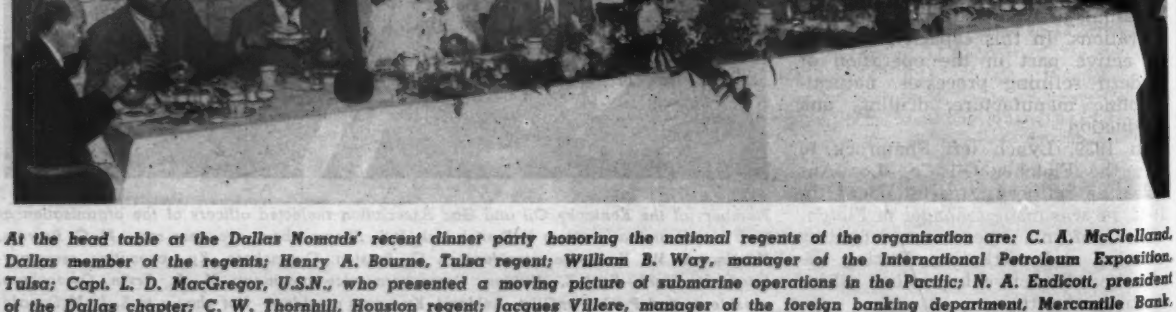
Henry H. Hewetson, president of Imperial Oil, Ltd., headed a party of oil officials which recently inspected operations in Leduc and Turner Valley fields. The party included **F. W. Abrams,** chairman of the board of Standard Oil Co. (N. J.); **Frank W. Pierce** and **Frank Hall,** directors of Imperial Oil; **Dr. O. B. Hopkins,** vice president in charge of production; **M. L. Hayder,** Toronto; and **Wallace Pratt,** former vice president and director of Standard Oil Co. (N. J.).

Cearcy D. Miller, a mechanical engineer formerly with the National Advisory Committee for Aeronautics, has joined the division of fuels technology, Batelle Institute, Columbus, Ohio.

J. A. Philpott, superintendent of gas plants for Tropical Oil Co., at El Centro, Colombia, has been promoted to El Centro district superintendent.

Glenver McConnell has retired after 15 years of service as chief mechanical engineer of the Tulsa district for Shell Oil Co., Inc. Before joining Shell, McConnell served as chief mechanical engineer of the Mid-Continent area for the old Roxana Petroleum Corp. McConnell, former president of the Tulsa School Board, also has resigned as a member of five committees of the American Petroleum Institute.

E. F. Bullard, president of Stanolind Oil & Gas Co., has been elected a member of the executive board of the International Petroleum Exposition and Congress, which will stage its first postwar exposition in Tulsa in May 1948. Bullard, president of Stanolind since 1945, also is president and director of Hudson Oil Co., Dickey Oil Co., Permian Oil Co., Yount-Lee Pipe Line Co., Stanolind Building Corp., and Ramsey Petroleum Corp.



At the head table at the Dallas Nomads' recent dinner party honoring the national regents of the organization are: C. A. McClelland, Dallas member of the regents; Henry A. Bourne, Tulsa regent; William B. Way, manager of the International Petroleum Exposition, Tulsa; Capt. L. D. MacGregor, U.S.N., who presented a moving picture of submarine operations in the Pacific; N. A. Endicott, president of the Dallas chapter; C. W. Thornhill, Houston regent; Jacques Villere, manager of the foreign banking department, Mercantile Bank, Dallas; Floyd Senter, Houston regent; H. M. Cosgrove, Tulsa, national secretary of the regents; and S. Pete Parker, Dallas regent

Philip D. Caesar, Paulsboro, N. J., and **William C. Skinner,** Dallas, have been appointed to receive the first

P. D. CAESAR

W. C. SKINNER

educational grants of Socony-Vacuum Oil Co., Inc. The grants, established to enable outstanding technical employes to study for advanced degrees, will provide full pay for the time necessary to earn degrees of doctor of philosophy. Caesar is employed by Socony-Vacuum in its research and development department in Paulsboro. Skinner is employed at the field research laboratories of Magnolia Petroleum Co., a Socony-Vacuum affiliate.

G. W. Beer, formerly assistant geologist, U. S. Geological Survey, Great Falls, Mont., has joined Carter Oil Co. at Rawlins, Wyo.

J. H. De Vries, general manager of Regie Autonome des Petroles (R.A.P.) flew to the United States last week from Paris for a business trip.

Curtis G. Cortelyou, General Petroleum Corp., has been elected president of the Southern California Meter Association. Other officers are **J. C. Groenewegen,** Shell Chemical Corp., vice president; **George H. Forster, Jr.,** The Texas Co., secretary-treasurer; and **J. Andrew Waltman,** Southern California Gas Co., auditor.

Vernon Lantz, chemist for Shell Development Corp. in the company's analytical laboratory at Emeryville, has been elected to the Oakland, Calif., City Council. **Homer H. Wood,** administrative assistant of Shell Oil Co., Inc., has been elected to the San Rafael, Calif., City Council.

SHIFTS—

Raymond M. Leeds, engineer, General Petroleum Corp., Bakersfield, Calif., to Casper, Wyo.; **J. M. Meyers,** foreman, Helmerich & Payne, Inc., Andrews to McCamey, Tex.; **Fraser H. Allen,** engineer, Stanolind Oil & Gas Co., Austin, Tex., to Tulsa; **Robert M. Stewart,** engineer, The Chicago Corp., Bishop to Carthage, Tex.; **Kermit D. Hutchins,** engineer, Magnolia Petroleum Co., Dallas to Powell, Wyo.; **Jewell C. Maxwell,** engineer, Atlantic Pipe Line Co., Dallas to Knoxville.

M. L. Pyle, engineer, Stanolind Oil & Gas Co., Midland to Longview, Tex.; **Robert M. Hippard,** engineer, Shell Oil Co., Inc., Odessa to Denver City, Tex.; **H. D. Teel,** geologist, Stanolind Oil & Gas Co., San Antonio to Wichita Falls, Tex.; **S. P. Kent,** engineer, Texas Petroleum Co., Hammond, La., to Caracas, Venezuela; **Charles A. Pitts,** engineer, Mene Grande Oil Co., Lafayette, La., to Barcelona, Venezuela; **H. H. Plummer,** engineer, The California Co., New Orleans to Denver.

Samuel M. Vauclain, geologist, Sun Oil Co., Tallahassee, Fla., to Jackson, Miss.; **Carl D. Ackerman,** engineer, Standard Oil Co. (Ind.), Wood River, La., to Pittsburgh; **Robert H. Martin,** geologist, The Texas Co., Mattoon, Ill., to Wichita Falls, Tex; **F. H. Latimer,** engineer, Sun Oil Co., Evansville, Ind., to Philadelphia, Pa.; **John A. Young, Jr.,** geologist, Sun Oil Co., Syracuse, N. Y., to McAllen, Tex.; **Stanley B. White,** geologist, Ohio Oil Co., Findlay, Ohio, to Durango, Colo.; **J. M. Lilligren,** geologist, Sinclair Prairie Oil Co., Fredericksburg, Va., to Sewickley, Pa.

J. D. Armour, engineer, Stanolind Oil & Gas Co., Rangely, Colo., to Midwest, Wyo.; **Carl E. Lee,** superintendent, Kerr-McGee Oil Industries, Inc., Boggs to Riverton, Wyo.; **Frank Lindeman, Jr.,** superintendent, Stanolind Oil & Gas Co., Oklahoma City to Houston; **Lester Wilkonson,** engineer, Stanolind Oil & Gas Co., Oklahoma City to Wichita, Kans.; **Paul T. Bail,** engineer, Stanolind Oil & Gas Co., Tulsa to Wink, Tex.; **Jess Vanbeber,** engineer, Sinclair Refining Co., Bartlesville to Skiatook, Okla.; **E. B. Stewart,** superintendent, Ohio Oil Co., Oklahoma City to Cement, Okla.

DEATHS

Edward Merle Dye, 41, oil operator associated with Paul Fleeger in Wichita, Kans., was killed July 3 in an automobile accident near Eads, Colo.

Frank B. Thompson, retired president of Victor Oil Co., Oklahoma City, died July 1 in a Miami Beach, Fla., hospital.

William Henry Leonard, 74, founder of Denver Rock Drill Manufacturing Co., which later was merged with Gardner-Governor Co. of Quincy, Ill., as the Gardner-Denver Co., died June 29 at his home in Denver.

C. E. Tabor, 53, general manager and a director of C. L. McMahon, Inc., Tulsa independent producing company, was killed July 6 in an automobile accident near Atoka, Okla. Tabor, associated with the company 16 years, had been superintendent of production prior to the death of C. L. McMahon in June 1946.

Arthur F. Baldwin, 62, formerly associated with Daily Crude Oil Co., died July 1 in Alma, Mich. Baldwin had retired last year from active business.

Laten Stanberry, 72, former chief supervisor of the Oil and Gas Division of the Texas Railroad Commission, and considered the first man ever employed by the commission to aid in regulating the state's oil industry, died July 6 in Austin. Stanberry was named chief clerk of the division when it was formed in October 1919 even before a supervisor was employed. He left the commission in 1926 to supervise drilling operations in Louisiana and Texas, returning 3 years later. For the last 6 years, he had been associated with the state General Land Office and at the time of his death was mineral supervisor.

Roy F. Duffield, 69, veteran oil operator and a native of Butler, Pa., died recently in Winfield, Kans.

Dr. Frank Clifford Whitmore, internationally known organic chemist and dean of the school of chemistry and physics at Pennsylvania State College since 1929, died recently at his home in State College, Pa. Whitmore, president of the American Chemical Society in 1938 and active in many other honorary and professional organizations, during the war included aviation fuels, lubricants, synthetic rubber, and explosives in his research activities.

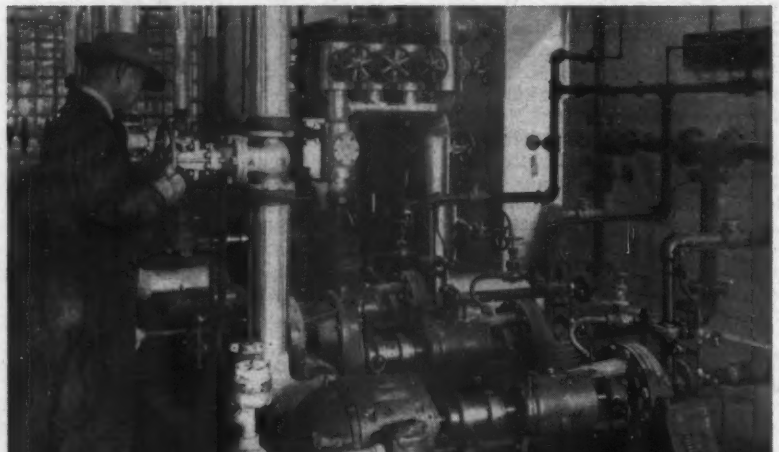
B. A. Adams, 40, construction engineer in East Texas field, died July 1 in a Kilgore, Tex., hospital.

Lawrence Gandy, driller for Delaney Drilling Co., Dallas, was killed June 30 in an accident at a well in Opelika field, Texas.

Guy T. Berry, 77, independent Kansas producer and former director of the Independent Petroleum Association of America, Mid-Continent Oil and Gas Association, National Stripper Wells Association, and the Kansas Independent Oil and Gas Association, died July 4 at his home in Independence, Kans.

QUALITY of Lubricating Oils IMPROVED

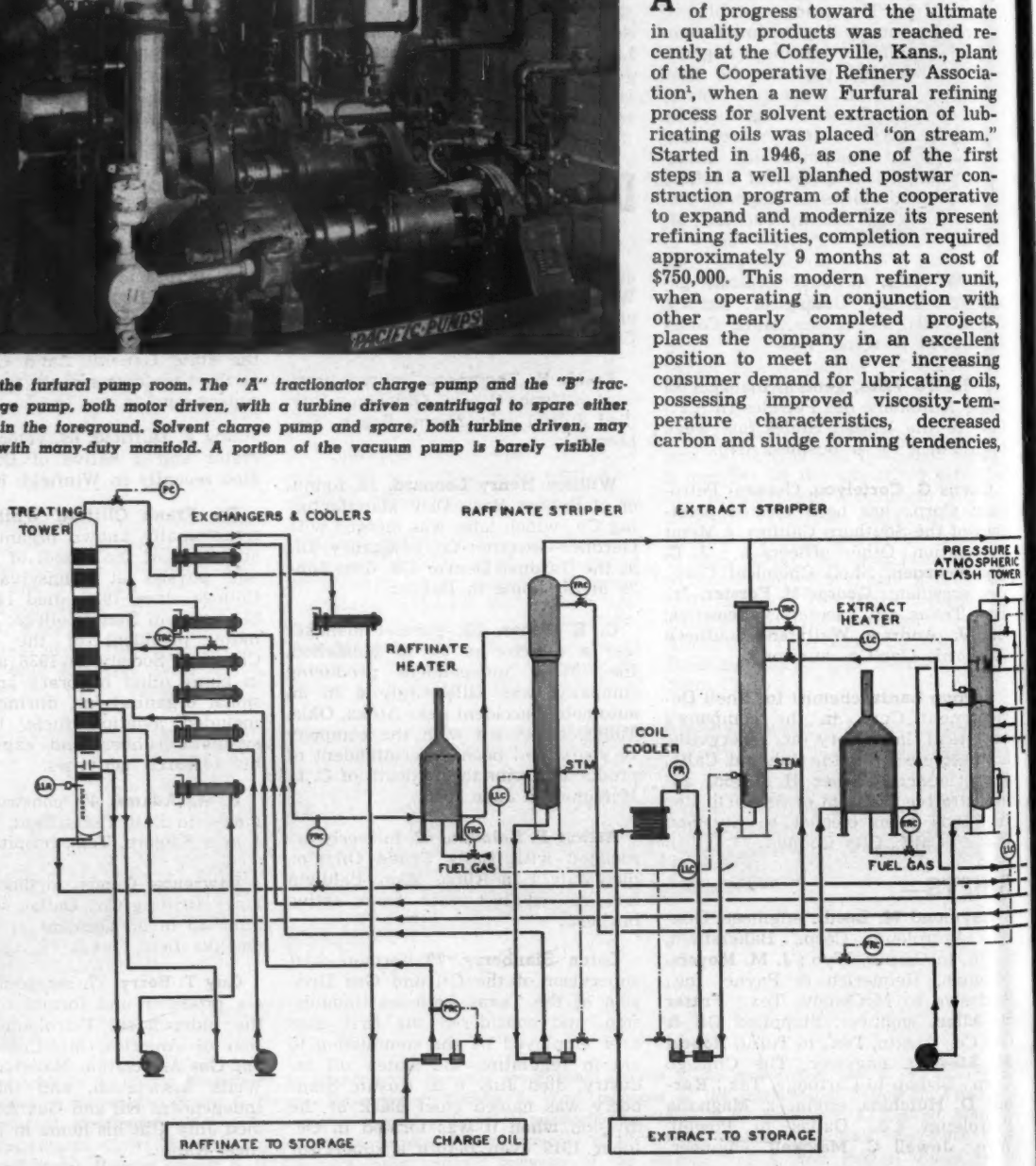
by Louis C. Brown
and C. F. Tears



A corner of the furfural pump room. The "A" fractionator charge pump and the "B" fractionator charge pump, both motor driven, with a turbine driven centrifugal to spare either service, are in the foreground. Solvent charge pump and spare, both turbine driven, may be seen with many-duty manifold. A portion of the vacuum pump is barely visible

By New Furfural Plant In Kansas Refinery

ANOTHER milestone along the path of progress toward the ultimate in quality products was reached recently at the Coffeyville, Kans., plant of the Cooperative Refinery Association[1], when a new Furfural refining process for solvent extraction of lubricating oils was placed "on stream." Started in 1946, as one of the first steps in a well planned postwar construction program of the cooperative to expand and modernize its present refining facilities, completion required approximately 9 months at a cost of $750,000. This modern refinery unit, when operating in conjunction with other nearly completed projects, places the company in an excellent position to meet an ever increasing consumer demand for lubricating oils, possessing improved viscosity-temperature characteristics, decreased carbon and sludge forming tendencies,



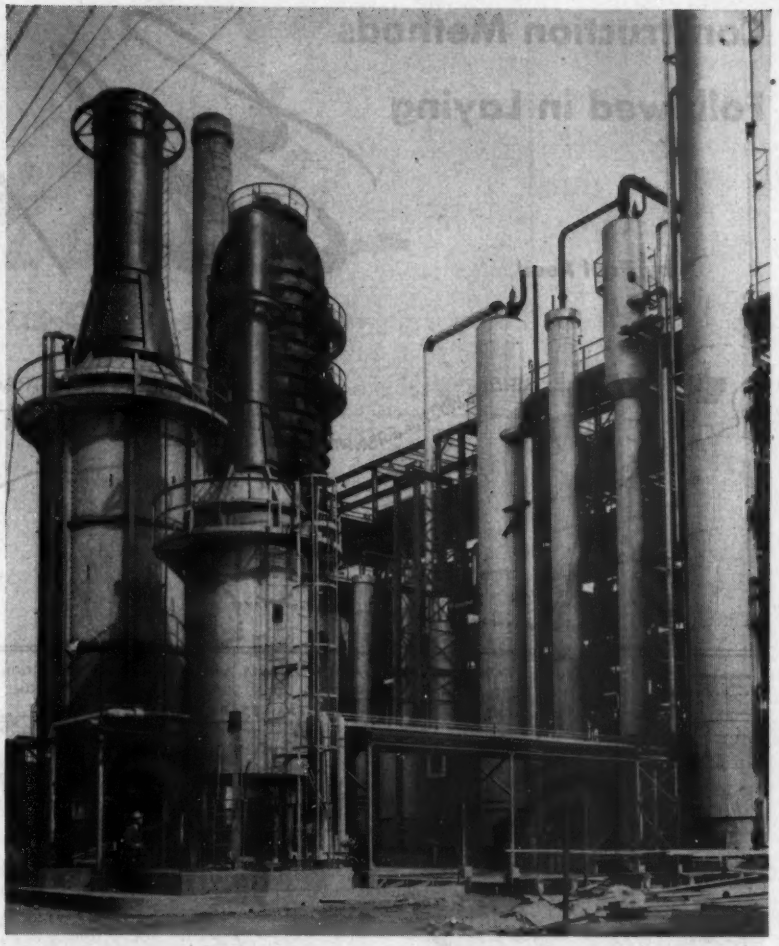
THE AUTHORS

L. C. BROWN

C. F. TEARS

Louis C. Brown joined Cooperative Refinery Association in 1944 as process engineer over HF alkylation and isomerization units. In 1946 he was appointed chief refinery engineer for C.R.A.'s three refineries. He is a 1934 graduate of the University of Notre Dame and was formerly with National Refining Co., Findlay, Ohio, as technical assistant in the operations department.

C. F. Tears is vice president of Process Engineers, Inc., Dallas. He graduated from Cornell University in 1917 and since has been in the process engineering field. He started with Walter E. Lummus Co., later serving with Universal Oil Products Co., M. W. Kellogg Co., and Alco Products, Inc. In the refinery operation field he has had experience with The Texas Co., Continental Oil Co., and Bradford-Penn Refining Corp. In the chemical field his experience includes design and operation of the Bishop, Tex., plant of Celanese Corp. of America.



A general view of the furfural plant. The towers, reading from right to left, are: treating tower, raffinate stripper, extract stripper, pressure flash, and atmospheric flash tower (single vessel with bulkhead separating top and bottom) pressure flash vapor—extract mix vertical exchanger. "A" fractionator, and "B" fractionator. In left foreground are the raffinate and extract vertical heaters

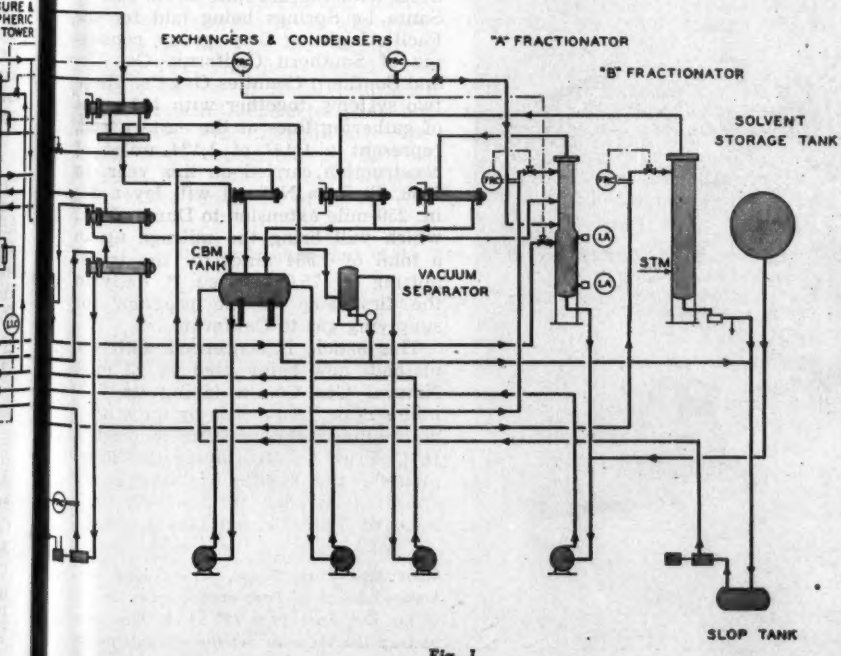


Fig. 1

higher flash point, and other improved specification values which are criteria of lubrication service.

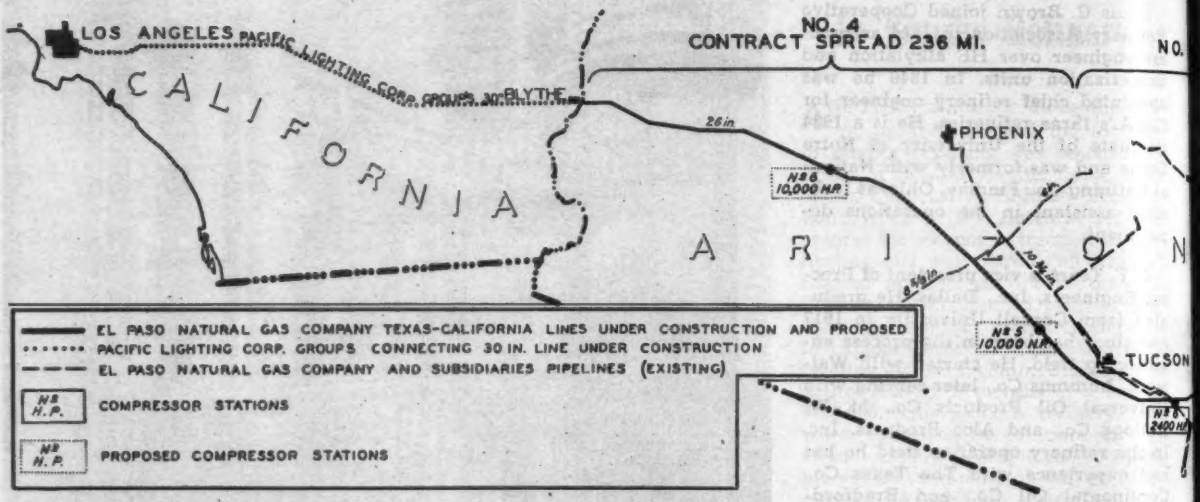
Scarcity of materials and equipment coupled with the fact that all energies during the war period were directed toward maximum output of products for the armed forces kept these plans shelved until early in 1946. Contractual negotiations with the licensor, The Texaco Development Corp., and with the engineering contractor, Process Engineers, Inc., Dallas, were finally completed and after preliminary plant layout, revision, site clearance, etc., ground was officially broken for construction July 25, 1946.

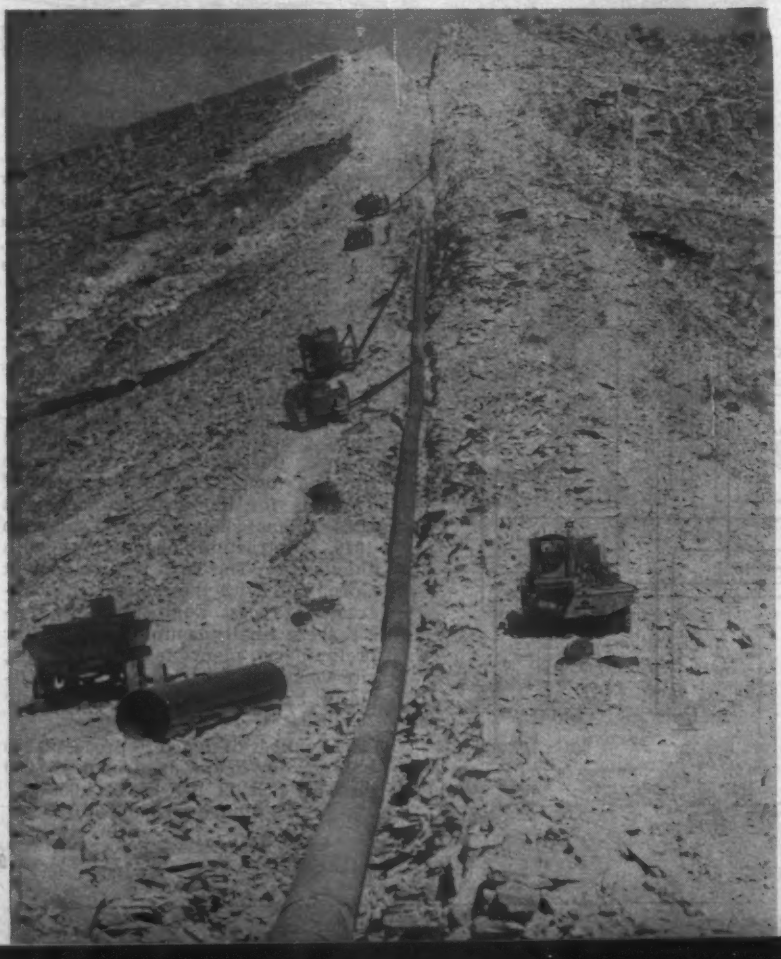
The unit is designed to process 2,200 bbl. per day of dewaxed neutral (200 viscosity SSU at 100° F.) or 1,050 bbl.

(Continued on page 96)

Construction Methods Followed in Laying El Paso

by Paul Reed





EL PASO NATURAL GAS CO is laying 740 miles of 26-in. pipe from Texas and New Mexico fields, terminating at the Colorado River on the Arizona-California boundary near Blythe, Calif. Here the line connects with the 214-mile 30-in. line to Santa Fe Springs being laid for the Pacific Lighting Corp. group, consisting of Southern California Gas Co. and Southern Counties Gas Co. These two systems, together with 180 miles of gathering lines at the eastern end, represent a total of 1,134 miles of construction carried on this year. In 1948, El Paso Natural will lay a 24-in. 250-mile extension to Dumas, Tex., which will bring the mileage up to a total of 1,584 miles for the transmitting of 175,000,000 cu. ft. daily in the first step of the program for supplying gas to California.

This article is concerned with the methods now being used by El Paso Natural Gas Co. in laying its 740-mile section. (An article by the author describing methods of the contractor, H. C. Price Co., for laying the 30-in. pipe for the Pacific Lighting group appeared on page 58, June 17, 1947, issue of The Oil and Gas Journal.)

Guadalupe Pass, Texas, where pipe was lowered by an El Paso spread from the top of the Rim Rock to a 45° slope. Pipe was laid up the slope to get the advantages of laying in compression

Natural's

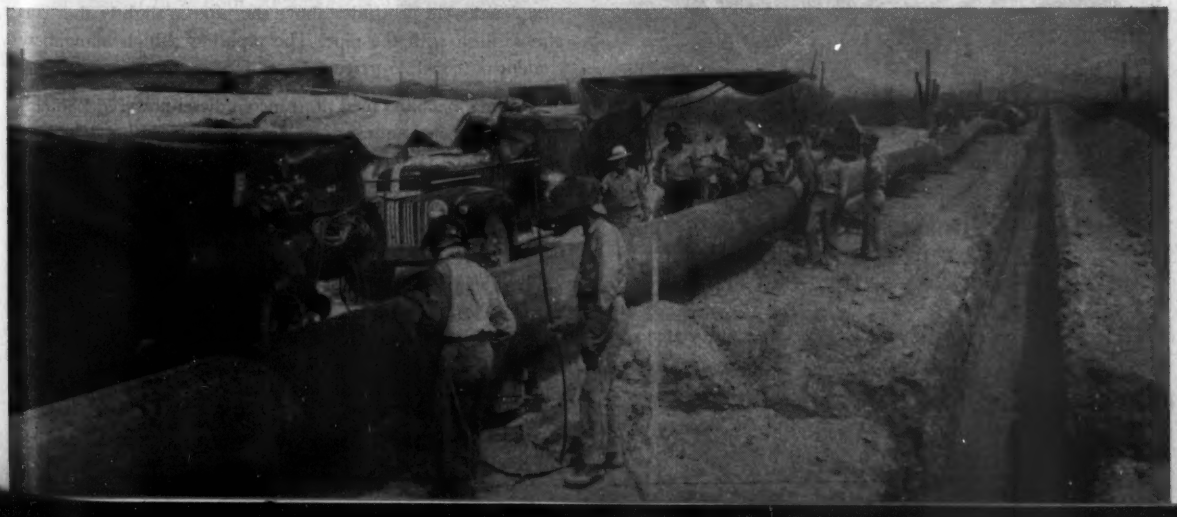
740-Mile, 26-in. Texas-California Line

Map of entire Texas-California line showing both the route of the El Paso Natural Gas Co. 740-mile 26-in. section and of the Southern California Gas Co. and Southern Counties Gas Co. 214-mile 30-in. section

In covering the construction undertakings, the author traveled east from the Southern California operations to visit spreads working for El Paso Natural. The first spread encountered east of the Colorado River was working late in May in the vicinity of Tucson, Ariz. This is a spread for a 230-mile section of 26-in. contracted by Midwestern Constructors, Inc. and S. W. D. Co., which has the only pipe-laying work contracted by El Paso Natural for the Texas-California project. The remainder of the job consisting of 514 miles of 26-in. is being laid by three spreads operated entirely by El Paso Natural Gas Co.'s own organization. The stringing for all the 740 miles of 26-in. for El Paso Natural's 1947 program is being done by Parkhill Truck Co.

The most conspicuous feature of the El Paso company's work is the use of Motorola two-way radio communication to increase the effectiveness of construction operations. El Paso Natural Gas has 10 cars, of foremen and superintendents of its own spreads and of the spread of Midwestern, equipped with these radio units. Similar radio stations also are established at field headquarters of each of the spreads. Radio communication is being applied extensively for the first time in pipe-line construction. It may be predicted that within 2 years all main-line spreads of the industry will be equipped for two-way radio communication. Units have an operating range of approximately 50 miles, within which conversations can be conducted over short-wave length

Stringer bead welders of the Midwestern and SWD Co. spread who are protected by special portable shelters



Laying the "Biggest Inch"

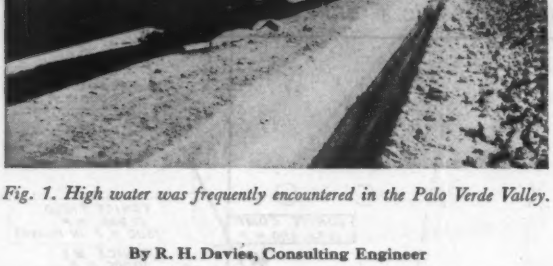


Fig. 1. High water was frequently encountered in the Palo Verde Valley.

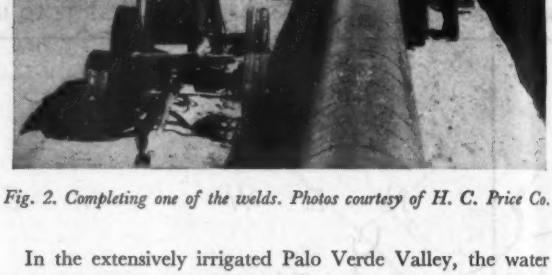


Fig. 2. Completing one of the welds. Photos courtesy of H. C. Price Co.

By R. H. Davies, Consulting Engineer
The Lincoln Electric Company, Cleveland, Ohio

Rugged terrain of every type . . . pipe of record size and weight . . . these conditions make the "Biggest Inch" pipe line, now being constructed across California from Blythe to Los Angeles, a pioneering project that is one of the most ambitious undertakings in pipe-lining history.

This is the first 30-inch high pressure gas transmission line ever built. It is 214 miles long. H. C. Price Co. is the general contractor for the Southern California and Southern Counties Gas Companies. At Blyth it ties in with the 26-inch line being built by Midwestern Contractors for The El Paso Natural Gas Co. from Eunice, N. M.

Terrain encountered includes sand-rock, desert, swamp conditions of high water-table irrigated land, orange groves, canals, city streets, bad lands and mountains.

Fig. 3. Cleaning a joint with portable buffer.

In the extensively irrigated Palo Verde Valley, the water table in many places was only 18 inches below the ground surface. The resulting cave-ins required the use of numerous clam shell dredges and drag lines to excavate the ditch (Fig. 1).

In the 150 miles of barren, bone-dry upper Colorado Desert, the mercury hits 130°, and every drop of water for men and equipment must be hauled great distances, often as much as 50 miles. And the desert is not all flat and smooth. Much of it is rolling and rocky. When they hit the Chino Mountains, Price's crews will have some of the toughest going ever encountered by pipe line builders.

Use Stove-Pipe Method

The line is being laid in 60-foot sections by the stove-pipe method, which has been found most efficient when dealing with large pipe and rugged terrain. In the stove-pipe method, one joint at a time is welded to the line, making possible smaller crews and more concentrated operations on each spread.

On this project the stringer bead is applied by four welders in each spread. First, two welders weld their segments; then the remaining segments are welded by the other two. Joints are completed by 12-14 bell-hole welders in each spread. Lincoln "Fleetweld 5" electrodes are used—5/32-inch for stringer beads and 3/16-inch for the second and last passes. The completed weld protrudes above the pipe so slightly that it is almost flush with the pipe. The pipe has a high manganese content of 0.85-1.25 percent.

Welding machines used are Lincoln diesel-powered "Shield-Arc," mostly 200-amp. rating. For the heavier pipe 300-amp. units are used. Wall thicknesses are 9/32, 10/32, 11/32, and 13/32 for overland; 1/2-inch for river crossing.

Just before welding, pipe ends are cleaned with a portable motor-driven buffer to remove all rust and dirt (Fig. 3). The outfit has a small engine driven generator.

The above is published by LINCOLN ELECTRIC in the interests of progress.
For further information on pipe welding, write for a free copy of Bulletin 418. The Lincoln Electric Company, Department 207, Cleveland 1, Ohio.

with little outside interference. Time has been saved in carrying on the work of each spread due to the fact that much lost motion is eliminated. Utility welders, repair mechanics, and ambulances may be ordered immediately. Needed parts may be quickly ordered directly from the field.

In some cases, parts for emergencies are brought from distant points by airplanes. For such service, the El Paso company uses a Stinson 150 and the Midwestern organization has a Navion 140-hp. three-passenger plane.

In visiting Midwestern and S. W. D. construction operations near Tucson, the author started at the back end where lowering in was being done early in the morning. A feature of this job is a special type of "slack-loop suspension" which is substituted for the common method for crotching the pipe on skids in the ditch. By this method, pipe is suspended by a belt from hooks on a steel beam fabricated from a 6 by 8-in. I-beam reinforced with steel gusset plates on the sides to prevent the coating from being injured by contact with the beam. A curved plate lined with belting is being installed under the center of the beam as an additional protective feature. The beam is conveniently moved by means of a steel eye placed on the upper part of the beam midway between the two hooks. Each I-beam suspension is supported by a set of two cribs made of skids. Each slack loop is held by two suspensions of this type placed 60 to 80 ft. apart. The El Paso company has a policy of using a slack loop every 700 to 800 ft. on level ground.

Lowering in is done by three boom tractors. A right-of-way 60 ft. wide was being cleared by two bulldozers and a road patrol. In this cactus desert country, there is no timber to be cut.

The 42 by 62-in. ditch providing for 36-in. cover is dug by one ditcher, two shovels, three back hoes, and a clam shell.

All bending for this spread is done by C.R.C. cold-wrinkle bending.

The welding force includes four stringer-bead welders, 14 bell-hole welders, and two utility welders. Machines are 300-amp. type.

All operations in the doping gang are done with C.R.C. equipment, including special new dope kettles.

Welding Problems

The next spread eastward is the El Paso Natural gang which is operating in the vicinity of Lordsburg, N. M., 165 miles east of Tucson. Construction of the 26-in. line by both the El Paso Natural and Midwestern organizations is following much the same general procedure. Spreads of both organizations are confronted by persistent annoyance due to sand which interferes with welding. Special types of shelter are being devised to make it possible to continue welding in the face of this difficulty. Temperatures during the day often rise to 110° and 115° F.

Both El Paso and Midwestern maintain camps for lodging and feeding construction personnel.

El Paso Natural Gas Co. has undertaken construction of the 514-mile eastern section of the pipe line with its own equipment and personnel for several reasons. Contrary to the practice of most natural-gas pipe-line companies, the El Paso Gas organization began operating a single spread of its own for carrying on construction of branch lines as far back as 1934, when it could see 6 years of expansion ahead which would justify this setup. Since then, expansion has continued to extend over a 14-year period in the program carried on under the direction of Paul Kayser, president, and C. C. Cragin, vice president and general manager.

The experience of the El Paso company indicates that the construction program has worked advantageously for its particular needs. Key men, concerned with operation and maintenance during the winter time, go into the field each summer on construction work during which they are paid customary construction salaries.

Much knowledge of the country which has been gained through this pipe-laying experience clarifies doubtful factors and so reduces the element of gamble in pipe laying. The El Paso company has gone even further to amplify its information in preparing this Texas-California project. A notable example is a survey costing $20,000 in which 60-in. holes were drilled at 100-ft. intervals along the route.

To facilitate identifying from an airplane the pipe-line route in desert areas, 20-ft. circles made of white lime were placed at 5-mile intervals and also at points where the route of the line changes direction. This has been found to be valuable for maintaining contact with the route in advanced stages of preparation.

The 740-mile 26-in. line being built from Eunice, N. M., to Blythe, Calif., has been divided into sections assigned to construction spreads directly supervised by C. L. Perkins, vice president and general superintendent, El Paso Natural Gas Co.

Spread 1: Eunice, N. M., to Guadalupe Mountains, Tex.; Jack Smith, spread superintendent.

Spread 2: Guadalupe Mountains to Deming, N. M.; Gaston George, spread superintendent.

Spread 3: Deming, N. M., to Tucson, Ariz.; R. W. "Lazy" Harris and E. W. Woody, spread superintendents.

The Tucson-Blythe section has been contracted by Mid-Western Contractors, Inc., and S. W. D.

After completing the 510-mile Eunice-Tucson section of 26-in. pipe, the El Paso construction organization will build the Eunice, N. M.-Dumas, Tex., 24-in. 250-mile section.

To expedite the work, advanced crews, smaller than main-line spreads, have been placed at certain critical points which include 6 miles at Apache Pass, Ariz., 7½ miles at Salt Lake, N. M., and 6 miles in an area known both as Texas Canyon and Dragoon Pass.

Probably the most important of this advanced work was done in the Guadalupe Mountains where a crew of 30 men were engaged in laying a mile of pipe down the face of an escarpment in the Rim Rock section, 110 miles from El Paso, where the ground sloped steeply at 45° for a distance of 1,200 ft. in which there was a 600-

Suspension of slack loop on Midwestern and SWD spread by the use of cribbing and a special type of steel bar

ft. drop in elevation. All bending for this unusual job was done on top of the Rim Rock where the ground is fairly level; 80-ft. sections of pipe were lowered by tractor from the Rim Rock within 2 days. Construction in this section was carried on in an upward direction in order to lay the pipe in compression. In doing this, pipe was pulled upward into position by winch line. Fairly level landings, 15 ft. in length, at intervals on the escarpment contributed toward supporting the pipe.

In the Apache Pass section, a gang is working with a 40-yard back hoe, a 210-cu.-ft. air compressor, a 3-amp. welding machine, and ½-yard clam.

Within the last 2 years, the El Paso company has been accumulating $1,400,000 worth of new construction equipment for three spreads for the Texas-California project. Prior to this time, they had equipment for only one spread.

Pipe Wall Thickness

Much attention has been given to adequate cutting of right-of-way to expedite later progress of the spreads. This has been accomplished by three crews for the El Paso organization and one crew for S.W.D.

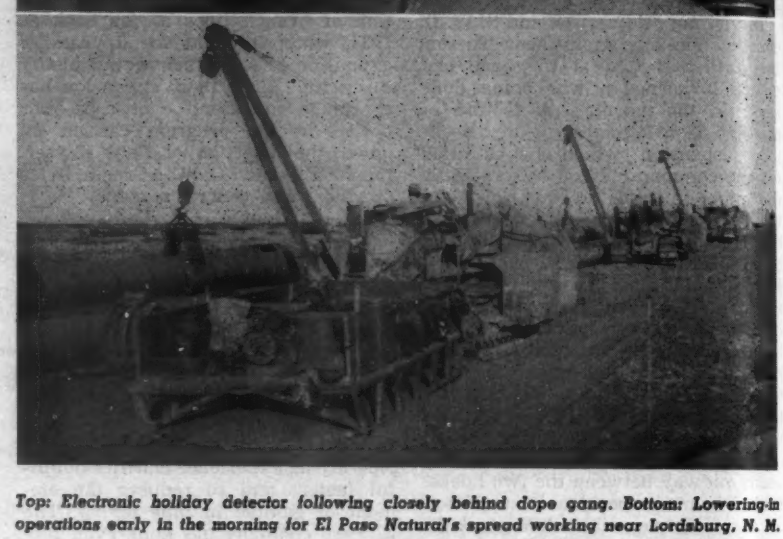
For distances of approximately 50 miles on the discharge side of each compressor station, pipe is either National Tube Co. 0.303 wall thickness, A. O. Smith Corp. 0.291 wall thickness, or Consolidated Steel Corp. 0.291 wall thickness. Pipe on the suction side of the station is A. O. Smith Corp. 0.281 wall-thickness pipe. Pipe at river crossings has ¾-in. walls. No river clamps are used. Concrete anchors at 50-ft. intervals overcome the pipe's buoyancy. All river crossings are double coated and wrapped.

The remainder of the line is single-coated with coal-tar enamel and wrapped with coal-tar-impregnated felt, except for 100 miles wrapped with kraft paper and Fiberglas. Across irrigated land, all pipe is wrapped with felt. Immediately following lowering in, a bulldozer "shades" the pipe with a few inches of backfill, prior to final complete backfilling.

Experience of the company during the last 15 years in operating lines parallel to the system now under construction indicates that there are high soil stresses in long sections across the desert. After the line has been in service a year, a survey will be conducted to determine the most appropriate method for installing cathodic protection. Rods will be welded at 1,000-ft. intervals to aid in obtaining data desired in cathodic-protection studies.

Large valves of the Serial No. 400 type are installed. Half of these will have automatic cut-off devices which will function when there are leaks or breaks.

Road and railroad crossings are being installed well in advance of regular pipe laying. The gang engaged in this work is equipped with a back hoe, a 5-ton truck with dual-axle trailer, a 210-cu.-ft. combination side-boom and bulldozer. Boring is done with the recently developed Dempsey air-driven 30-in. punch. The ends of 30-in. casing at crossings are stopped by WM seal casing bushings; 4-in. vents are installed on the casings.



Top: Electronic holiday detector following closely behind dope gang. Bottom: Lowering-in operations early in the morning for El Paso Natural's spread working near Lordsburg, N. M.

The driver of the ambulance which accompanies each spread has special duties assigned to him for the safeguarding of telephone and power lines near boom-tractor operations. Each ambulance has complete first-aid facilities and is equipped with two-way radio so as to be ready to serve quickly when accidents occur.

Ditching is done by the two-stage method. Spreads No. 1 and No. 2 each have a No. 12 Buckeye ditcher which digs to a depth of 30 in., while a larger Model No. 48 ditcher finishes the 42-by-66-in. ditch; No. 3 spread has two No. 48 ditchers. The two-stage ditching method makes it possible to progress satisfactorily with a combination of one small ditcher with a large ditcher. Slopers are used on the ditcher where needed. S.W.D. has been using a drag but the El Paso spreads have been following the policy of digging the ditch 4 in. deeper and leveling with spoil to get the desired square bottom to the ditch, due to extremely hard formations.

The ditching machines operate 15 miles ahead of the pipe gang; the bending crew operates 1 mile ahead of the pipe gang. Lowering in is done approximately 8,000 ft. behind the pipe gang. The practice followed by the El Paso spreads is to have two stringer-bead welders run the stringer bead. Immediately following the stringer-bead welders are two welders who strip two-thirds of the joint on either side. There are three stringer-bead welders with the pipe gang; the third man is a relief welder who spells the other two. Behind the stripper-bead welders there are nine bell-hole welders. The welding of the stringer bead is done with a 300-amp. machine and the use of Fleetweld No. 85 (5/32-in. rod); the filler beads are Fleetweld No. 100 (3/16-in. rod). The finished bead is made with a Fleetweld No. 85 (3/16-in. rod). This is the procedure for welding National Tube pipe. For A. O. Smith pipe, the same sizes are used; the stringer bead is made with Fleetweld 5, and other beads with Fleetweld 85.

Tube turns are welded with three beads inside and five beads outside. The ¾-in. river pipe is welded with 15 beads.

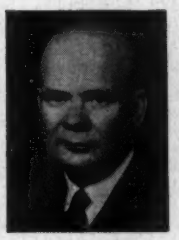
The El Paso company is following a policy of filling completed sections of line with gas so that when the 26-in. system is finally completed, it will be possible to make immediate deliveries on schedule to California in November.

Sohio's 1 Howard

Case History of Oklahoma's Eola Field Discovery Well

by Frank H. Willibrand and Don L. Hyatt

SOHIO PETROLEUM CO.'S 1 Howard was spudded on November 25, 1945, in SE SE NW 17-1n-2w, Garvin County, Oklahoma, and completed 14 months later on January 23, 1947. The well was completed at a total depth of 10,234 ft. with 5½-in. pipe set at 10,046 ft. on top of the Basal Bromide sand. On initial test, the well flowed at the rate of 100 bbl. per hour through the 2½-in. tubing and 1⅛-in. choke.



F. H. WILLIBRAND

D. L. HYATT

After a 22-hour drill-stem test in the lower McLish at 10,550-10,818 ft., during which the flow of oil averaged 28 bbl. per hour, Sohio Petroleum Co. announced that its 1 Howard, discovery well of Eola field, would have the lower zone plugged off and resume producing from the upper McLish reservoir.

This article presents the official data on the reservoir performance of the upper McLish pay, as well as data on drill-stem tests, cores, and drilling time to that pay. There are five wells actively drilling within a 1-mile radius of the discovery, three of them by Sohio and two by Republic Natural Gas Co.

Frank H. Willibrand, coauthor with Don L. Hyatt, is division manager, Mid-Continent division for Sohio. Hyatt is district geologist in charge of the Oklahoma, North and West Texas district for the company.

Geology

The available geological information suggested favorable structural conditions to be present in the Mill Creek syncline in Township 1 north, Range 2 west. Favorable reservoir conditions were expected in the sands of the Simpson member of the Ordovician. A geophysical survey was made in the area in the spring of 1944 outlining the present known structure on which the 1 Howard was drilled.

The Eola structure is considered as a minor parallel fold to the adjacent buried Arbuckle Mountain front which lies immediately south of the field. The structure is anticipated to be the narrow, hairpin type in which production probably will be controlled, or at least influenced, by one major fault and some minor faults. The geophysical data and limited geological information are not sufficient at this time to indicate the areal extent of the pool or to locate minor faults which are believed to be present.

The formations penetrated were typical of this area and are set up in the graphic log. This log shows the principal formations penetrated, the depths at which they were encoun-

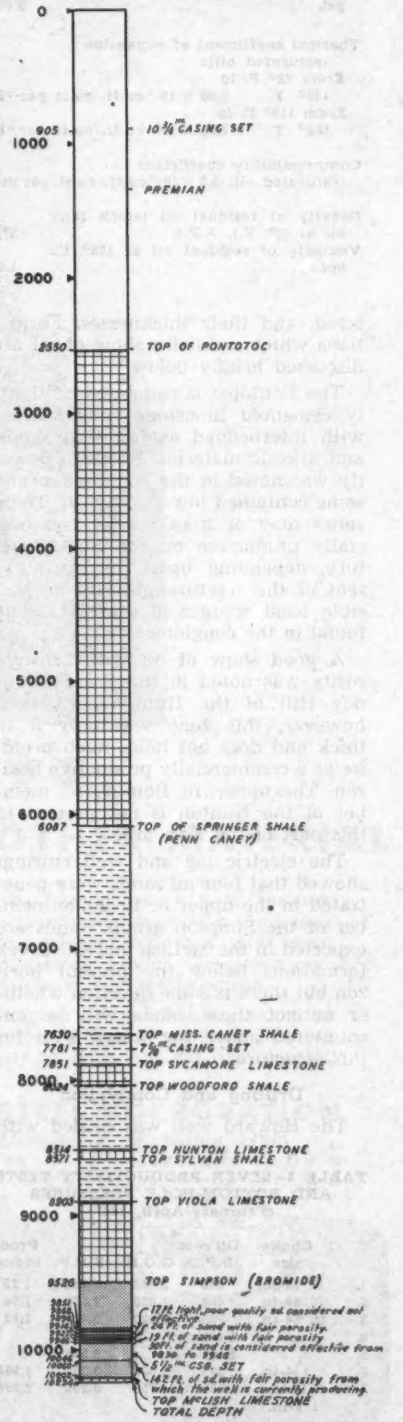


Fig. 1—Graphic log of 1 Howard

TABLE 1—RECORD OF CORES RELATING TO DRILL-STEM TESTS

Core 2 and DST 1—6,013-27 ft. Rec. 6 ft. 0 in. Top of oil show at 6,010 ft. Conglomerate with dense fractured dolomitic lime, cherty lime. Small amount of green sand at top of core. Top 3 ft. had no stain or odor in conglomerate. Bottom 3 ft. had show of dark brown, live oil with seepage of gas from fractures. Coring time: 45-53-48-28-25-25-27-26-24-25-25-26-17-37.

Core 3 and DST 2—6,027-34 ft. Rec. 4 ft. 6 in. Top 3 ft. dolomitic limestone and dolomite, fractured, hard, gray to buff, with stains in fractures which bled with gas. Oil and gas show better than in Core 2. Bottom 1 ft. 6 in. lime, dolomitic lime, fractured, hard, but no staining. Fracture contained secondary crystallization. Time: 43-49-44-36-36-41-38.

Core 5 and DST 3—8,566-75 ft. Rec. 4 ft. 0 in. Green to gray-green Sylvan shale. Samples from 8,564-66 ft. showed remarkably good porosity, light stain and odor, slight fluorescence in thin, oolitic lime zone. Time: 35-45-44-46-47-70-138-85-46.

Core 8 and DST 4—9,856-57½ ft. Rec. 1 ft. 0 in. Sand, fine-grained, well-cemented, poor porosity and permeability, slightly shaly, slight stain and odor. Time: 5 hours 15 minutes.

Core 10 and DST 5—9,931-37 ft. Rec. 1 ft. 0 in. Sand, shaly tight fine to medium-grained with stain and odor. Time: 24-27-34-37-48-43.

Core 11 and DST 5—9,937-43 ft. Rec. 3 ft. 6 in. Sand, shaly fine to medium-grained, not as tight as in two previous cores. Stain and odor. Time: 36-24-28-32-25-21.

TABLE 2—BOTTOM-HOLE SAMPLE ANALYSIS

Date sample taken	1-31-47
Shut-in time prior to sampling, hours	72
Sampling depth, ft.	10,000
Pressure at sampling depth, psi.	3,780
B. T. temperature (10,070), degrees	168
Original saturation pressure, psi.	3,713
Original gas in solution, cu. ft./bbl.	1,327
Relative liquid volume at initial formation conditions, bbl./bbl. stock tank oil	1.73
Initial formation pressure (10,000 ft.), psi.	3,803
Thermal coefficient of expansion (saturated oil):	
From 72° F. to 116° F.	5.80×10^{-4} cu.ft./cu.ft. per °F.
From 116° F. to 168° F.	7.65×10^{-4} cu.ft./cu.ft. per °F.
Compressibility coefficient (saturated oil)	5.8×10^{-6} cu.ft./cu.ft. per psi.
Gravity of residual oil (stock tank oil at 60° F.), A.P.I.	37.8
Viscosity of residual oil at 168° F., cps.	1.85

tered, and their thicknesses. Formations which carried a show of oil are discussed briefly below.

The Pontotoc is composed of tightly cemented limestone conglomerate with interbedded shales, thin sands, and arkosic material. Fracture porosity was noted in the cores taken and some contained low-gravity oil. These zones may or may not be commercially productive on the Eola structure, depending upon the areal extent of the fracture porosity or possible local wedges of porosity being found in the conglomerate.

A good show of oil with fair porosity was noted in the Basal Chimney Hill of the Hunton formation; however, this zone was only 5 ft. thick and does not hold much promise as a commercially productive horizon. The upper, or Bois d'Arc, member of the Hunton is not present in this part of the Eola area.

The electric log and well cuttings showed that four oil sands were penetrated in the upper or Bromide member of the Simpson group. Sands are expected in the McLish and Oil Creek formations below the present horizon but there is some question whether or not these sands will be encountered above the water level for this structure.

Drilling and Completion

The Howard well was drilled with a company-owned rig made up of the following equipment:

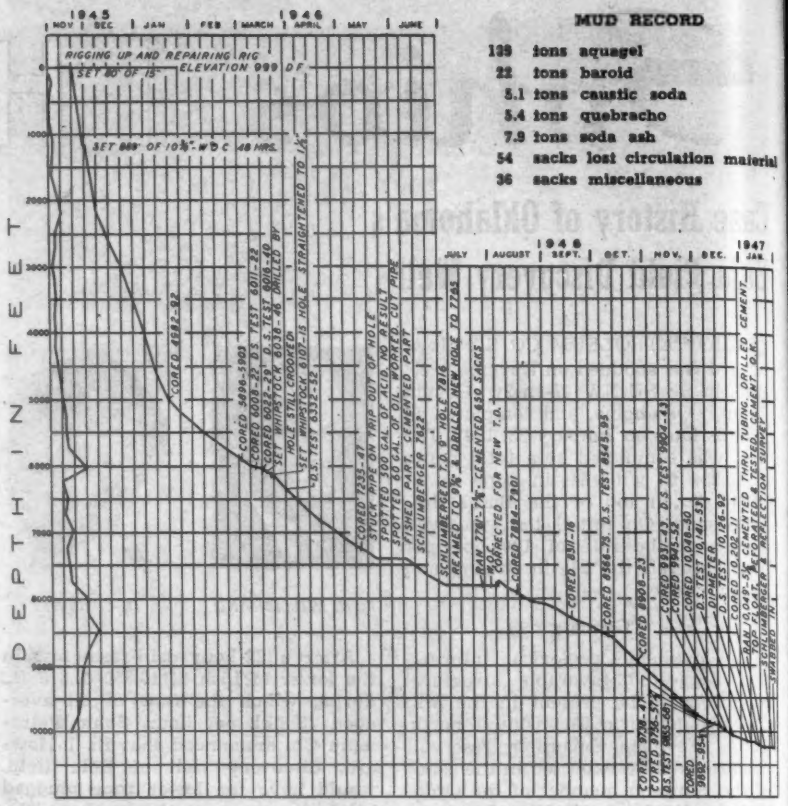
1—7½-in. RB Ideal unitized draw works
2—7¼-by-14-in. mud pumps
2—12-cylinder Leroi gas engines
1—NKU Waukesha gas engine

The well was drilled with 4½-in. drill pipe.

TABLE 3—SEVEN PRODUCTIVITY TESTS AND BOTTOM-HOLE PRESSURES (February-April, 1947)

	Choke size	Oil rate B.P.D.	G.O.R.	B.H.P.	Prod. index
1.	12/64-in.	260	1,152	3,653	1.73
2.	16/64-in.	406	1,080	3,570	1.74
3.	20/64-in.	735	1,020	3,400	1.82
4.	.....	Static	....	3,803	....
5.	.....	Static	....	3,588	....
6.	1/4-in.	395	1,000	3,367	1.966
7.	5/16 and 1/8-in.	733	950	3,239	2.295

Bottom-hole temperatures, 168° F.


1945
NOV
DEC
JAN
FEB
MARCH
1946
APRIL
MAY
JUNE
JULY
AUGUST
1946
SEPT.
OCT.
NOV.
DEC.
1947
JAN
RIGGING UP AND REPAIRING RIG
SET 10" OF 15" ELEVATION 999 D.F.
SET 869' OF 10¾" W.O.C. 48 HRS.
CORED 4892-92
CORED 5496-5903
CORED 6008-22 D.S. TEST 6011-33
CORED 6021-29 D.S. TEST 6018-40
SET WHIPSTOCK 6038-46 DRILLED BY
HOLE STILL CROOKED
SET WHIPSTOCK 6101-15 HOLE STRAIGHTENED TO 1½°
D.S. TEST 6332-52
CORED 7233-47
STUCK PIPE ON TRIP OUT OF HOLE
SPOTTED 300 GAL. ACID WORK RESULT
SPOTTED 300 GAL. OF OIL DOWN DRILL PIPE
FISHED PART CEMENTED PART
SCHLUMBERGER 7822
SCHLUMBERGER T.D. 9" HOLE 7816
REAMED TO 9⅞" & DRILLED NEW HOLE TO 7985
RAN 7IN.-24" CEMENTED 650 SACKS
CONNECTED FOR NEW T.D.
CORED 7984-7801
CORED 8311-76
CORED 8566-76 D.S. TEST 8543-93
CORED 8903-23
CORED 9004-43 D.S. TEST 9005-43
CORED 9044-63 D.S. TEST 9045-63
CORED 10,048-50
D.S. TEST 10,141-53
DIPMETER
D.S. TEST 10,126-52
RAN CORES 10,28[illegible] CEMENTED THRU TUBING DRILLED CEMENT
RAN FLOAT & PERFORATED & TESTED CEMENT O.K.
SCHLUMBERGER & PERFECTION SURVEY
CORED 9904-54
CORED 9983-[illegible]
TWISTED OFF
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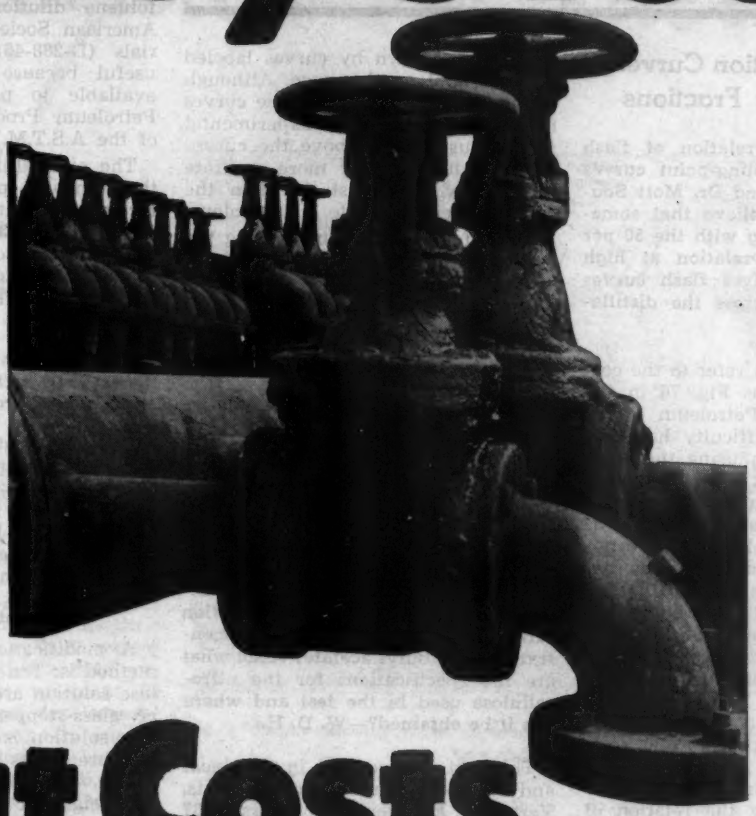
TWISTED OFF

Alloy Steels



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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Flash Vaporization Curves of Narrow Boiling Fractions

In using the correlation of flash curves and true-boiling-point curves developed by you and Dr. Mott Souders in 1931, we believe that something must be wrong with the 50 per cent boiling point relation at high temperatures. It gives flash curves that do not even cross the distillation curve.—R. N. S.

The question must refer to the correlation presented as Fig. 76 in the Second Edition of Petroleum Refinery Engineering. Difficulty has long been encountered in using the true-boiling-point versus flash-curve relationship of this figure. Undoubtedly the reason for the strange results is the fact that the relation was originally based on data on crude oils (because few other data were available). Since crude oils all have somewhat large slopes, the correlation scarcely applies to narrow fractions such as those encountered in vacuum plant design.

Even now (16 years later) data are not available, except the few scattered points shown on Fig. 1. However, considerable data have become available concerning the relation of true-boiling-point and A.S.T.M. distillation curves (Nelson and Hansburg, The Oil and Gas Journal, August 3, 1939, p. 45). Inasmuch as the relationship between A.S.T.M. and flash curves is well established (Fig. 75 in Petroleum Refinery Engineering), it is possible to compute desired flash true-boiling-point relationship as shown by curves labeled (A) in Fig. 1 on this page. Although not many direct data underlie curves marked (A), nor do the experimental points cluster well above the curves they are undoubtedly more accurate for narrow boiling stocks than the curves based on crude oil (B) alone.

The references used in plotting the few circle points shown are:

1. Edmister, Reidel & Mervin, Equilibrium Flash Vaporization of Three Petroleum Fractions, A.I.Ch.E. 39, 457 (1943).

2. Fancher, G. H., The Vaporization of Petroleum and Pressure Distillates, Pet. Engineer, March 1931, p. 176.

3. Piromoov & Beiswenger, A.P.I. Bulletin 10, No. 2, Sect. 2, p. 52, 1929.

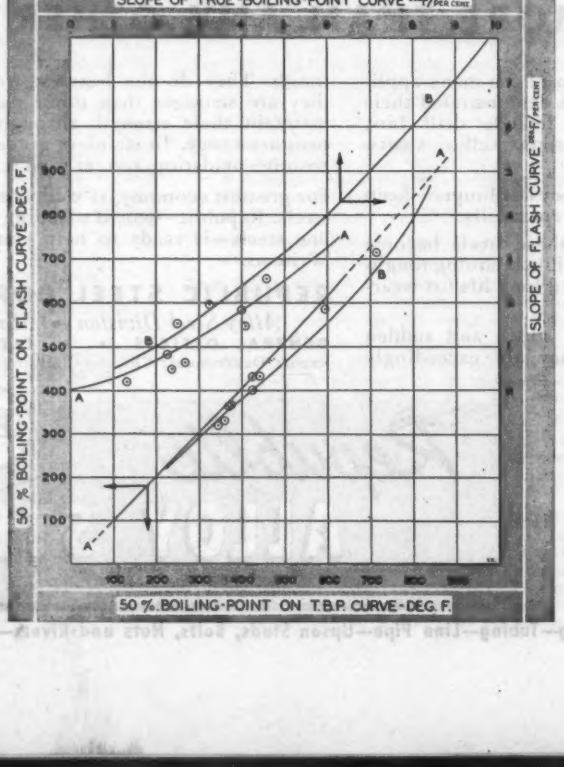
SLOPE OF TRUE-BOILING-POINT CURVE DEG F/PER CENT
50 % BOILING-POINT ON FLASH CURVE-DEG. F.
SLOPE OF FLASH CURVE DEG F/PER CENT
50 %. BOILING-POINT ON T.B.P. CURVE-DEG. F.
A
B

Fig. 1—Relation of true boiling point to flash curves for narrow-boiling-range fractions (A) and crude oils (B)

Nitrocellulose Dilution Ratio Procedure

Where can we find a complete description of the test procedure for determining the "nitrocellulose dilution ratio" at a 10 per cent final concentration with butyl acetate? Also, what are the specifications for the nitrocellulose used in the test and where can it be obtained?—W. D. H.

This test is described in "Physical and Chemical Examination of Paints, Varnishes, Lacquers, and Colors" 1937 edition by H. A. Gardner (Institute of Paint and Varnish Research, 2201 New York Avenue, N.W., Washington, D. C.). Similar tests (including the use of ethyl acetate) are described in Thomas H. Durran's book entitled "Solvents" which is a monograph of the applied chemistry series of Chapman & Hall, publishers. Finally, the toluene dilution ratio test of the American Society for Testing Materials (D-268-46) may be generally useful because it will be readily available to petroleum refiners in Petroleum Products and Lubricants of the A.S.T.M.

The nitrocellure should conform to the standard specifications and tests for soluble nitrocellulose (A.S.T.M. Designation D-301), and if it is to be used for the toluene dilution ratios of butyl acetate and methyl normal propyl ketone it should give results as follows:

	Toluene dilution ratio
Normal butyl acetate	2.72-2.83
Methyl normal propyl ketone ..	3.80-3.90

The specifications of two of these materials are stated by the A.S.T.M., i.e., toluene D-362 and butyl acetate D-303, and the methyl normal propyl ketone should have a purity in excess of 99 per cent as determined by the hydroxylamine method.

Modification of Method

A modification of Gardner No. 2 method is: Ten grams of a nitrocellulose solution are weighed into a 125-cc. glass-stoppered Erlenmeyer flask. The solution is prepared by dissolving three parts by weight of bone-dry ½-sec. nitrocellulose in seven parts by weight of normal butyl acetate. Dry nitrocellulose is explosive and hence it is advisable to make a stock solution rather than repeatedly to handle the dry gun cotton. The solution should be tightly stoppered and kept in the dark. An additional 1.2 cc. (1 g.) of acetate is added and 15 cc. of the thinner undergoing test.

The mixture is shaken, and successive 1-cc. portions of the thinner are added and shaken until finally the small globules of separated cotton just fail to dissolve. In the test as outlined here, a total of 8 g. of butyl acetate is employed, 3 g. of cotton is in the mixture, and hence the weight of solvent added is equal to the total weight (at cotton final) less 11. Thus, if the final weight of the mixture is 21 g., the amount of thinner added is 21 minus 11 or 10 g., and the dilution ratio is 10 divided by 8, or 1.25. For high-solvency naphthas the "additional" 1.2 cc. of butyl acetate may be omitted, and for paraffinic naphthas it is advisable to add 2 or 3 extra grams of acetate. These modifications assist in keeping the final percentage of cotton in the mixture at about 10 per cent, a concentration that is common in many commercial operations.

MORE EFFICIENT *Utilization of Fuels*

Provided by New High-Compression Automobile Engines

by Charles F. Kettering

The motor car of the future: What kind of an engine will it have? What fuels will it use? What efficiency will be obtained? A most interesting and significant report on these subjects appear below. It finds that a new 12.5-to-1 compression ratio engine, using triptane, gives a 40 per cent gain in fuel efficiency. The presentation is an abridged version of a paper presented before the summer meeting of the Society of Automotive Engineers in French Lick, Ind., the first week in June. The author, widely known engineer and scientist, was for many years vice president in charge of research and development for General Motors Corp. On June 3 he retired from this position, but will continue as a member of the board of directors and as consultant to General Motors. Most recent of the many honors paid the "Boss" for his scientific contributions was the award of an honorary doctor of science degree from University of Michigan on June 9.

KEY to higher efficiencies in internal combustion engines is in the increase of the compression ratio. In times past, attempts to utilize this important principle in spark-ignition engines have run into fuel knock. It is well known that the large gains in efficiency made by the diesel engine are due mainly to increasing the compression ratio.

To obtain the better high efficiencies from high-compression ratios there have been two approaches. Fig. 1 shows the story. Crude oil as nature gives it to us can be refined and processed to make either diesel fuel or gasoline. In making diesel fuel the right-hand path is taken on the diagram to obtain the characteristics essential for this type of engine. In making gasoline, the left-hand path around the diagram is taken to obtain as high octane number as possible. In both cases the end result is a high-compression engine giving high thermal efficiencies.

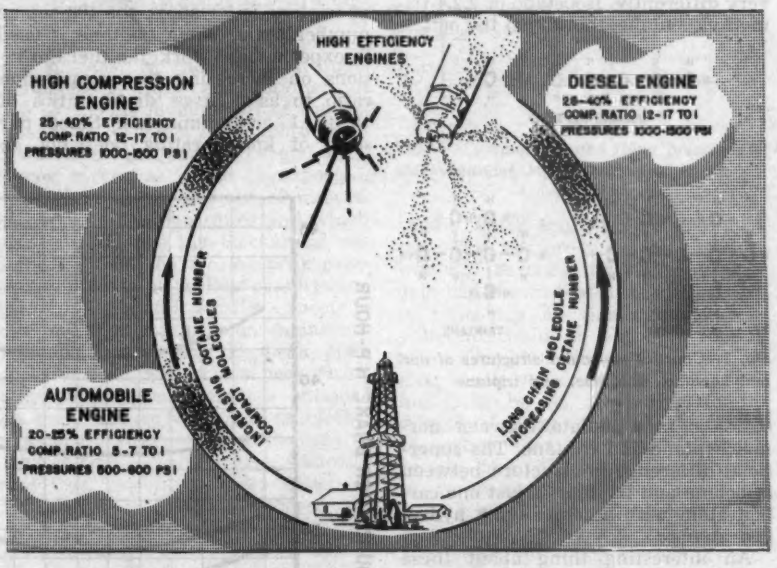

Fig. 1—Engine-efficiency circle, showing approaches toward obtaining greater efficiencies from high-compression ratios

At present diesel engines are operating with a range of compression ratios between 14 and 17 to 1, and with brake thermal efficiencies as high as 38 per cent. If equivalent compression ratios can be used in spark ignition engines, the same full throttle brake thermal efficiencies should be obtained. The reason automobile engines are in the range shown on the chart of about 6½ to 1 compression ratio with a maximum of about 25 per cent thermal efficiency is because engines and fuels have not yet been adequately matched.

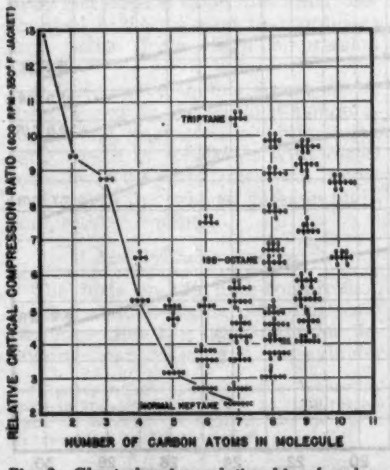

Fig. 2—Chart showing relationship of molecular structure of paraffins to critical compression ratio of a special test engine under severe conditions

The knocking characteristics of a fuel are related to the molecular structure in a very definite order. It was the discovery of this property of hydrocarbons which expedited the development of high-octane fuels. Fig. 2, which contains data obtained with the cooperation of the American Petroleum Institute, illustrates the relationship of molecular structure of one family of hydrocarbons, the paraffins, to critical compression ratio of a special test engine under severe engine conditions. Under these test conditions normal heptane, the low end of the octane scale, has a critical compression ratio a little under 3. Isooctane, the high end of the octane scale, has a value of about 6½. Triptane, the top of the heptanes has a value of 10½. These values, of course, pertain only to these particular engine conditions which were chosen for convenient illustration and would

be greater under milder operating conditions. Triptane has been operated at compression ratios as high as 14.4 clear or 18 leaded. As can be seen, many other hydrocarbons have antiknock quality. The petroleum chemist works to produce these higher octane fuels in developing refining practice.

Fig. 3 shows the molecular structure of normal heptane and triptane which are hydrocarbons with the same empirical chemical formula, C_7H_{16}, and yet the engine rates them very differently. Isooctane or 2,2,4-trimethyl pentane, the 100 on the octane

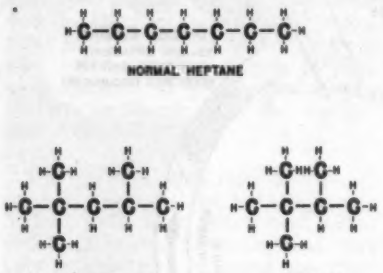

Fig. 3—Chart of molecular structures of normal heptane, isooctane, and triptane

scale, is intermediate between normal heptane and triptane. The superficial difference in structure between isooctane and triptane is just one carbon atom with accompanying hydrogen atoms.

An interesting thing about these carbons is the way lead behaves in them. The addition of 3 ml. of lead per gallon to heptane raises its critical compression ratio about 0.5 unit. The same addition of 3 ml. of lead to isooctane raises the critical compression ratio 4 units. The same addition to triptane runs it off the measuring scale.

Triptane Experience

A paper on "Fuels and Engines for Higher Power and Greater Efficiency" given before the S.A.E. in January 1945 reviewed the work on these subjects and presented the latest fuel work on triptane. Triptane (2,2,3-trimethyl butane) is one of the best fuels known from the standpoint of knock. It had first been tested in an engine in 1926. In 1943 a small-scale pilot plant was completed to make pure triptane by a process developed in our laboratories. The knock rating of triptane is far above the 100-octane number scale. When triptane is used in experimental work, the fuel limitations on increasing the compression ratio to as high as diesel ratios of 15 to 1 are eliminated. Since our scale of knock rating does not go above 100 and is an arbitrary unit at best, we cannot say exactly what the knock rating of triptane really is. We do have evidence that its performance number with tetraethyl lead added may be as much as 500 under some engine conditions compared with 100 for isooctane.

When we resumed the work on high compression engines after the war we had available several thousand gallons of pure triptane and had a plant in operation to make it in sufficient quantities for a long-range engine-development program. We were, therefore, in a favorable position to increase the compression ratio in a spark-ignition engine as high as 15 to 1 or in the diesel range without encountering knock. It was only on the single-cylinder work that

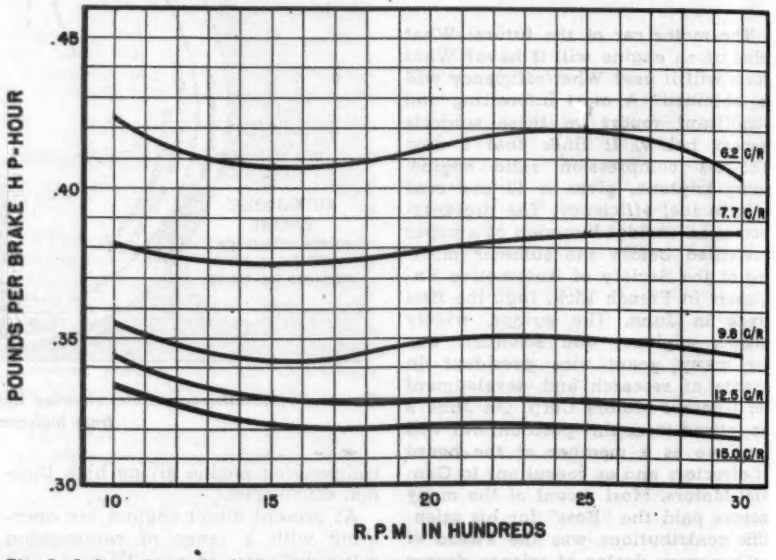

Fig. 5—Indicated specific fuel consumption of the single-cylinder, high-compression engine

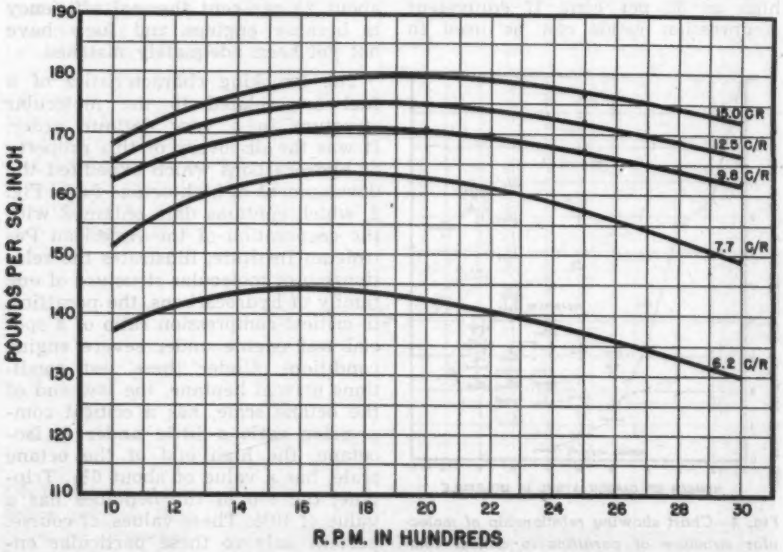

Fig. 4—Indicated mean effective pressures of the single-cylinder, high-compression engine for various compression ratios

the full advantage was taken of triptane's high antiknock quality. This gave an opportunity to study the whole practical compression ratio range without being limited by the knocking characteristics of the fuel.

Single-Cylinder Program

A single-cylinder engine of 30-cu.-in. displacement was built to explore the range of compression ratios beginning at approximately 6 to 1 and extending up to 15 to 1. This engine had overhead valves in order to maintain the most effective use of the available combustion space for clearance and breathing capacity. This also kept surface to volume ratio to a minimum. Bore and stroke were 3⅜ by 3⅜. The engine was designed to give the required strength and rigidity for compression ratios up to 15 to 1, otherwise the engine was conventional in design. The compression ratio was varied from 6.2 to 1 to 15 to 1 in five steps by changes in pistons. The purpose of this single-

cylinder engine program was to obtain basic data on the effects of compression ratio on performance and efficiency.

TABLE 1—PER CENT INCREASE OF I.M.E.P. WITH INCREASE OF COMPRESSION RATIO

Ratio	I.M.E.P. at 2,000 (per cent)	I.M.E.P. at 3,000 (per cent)
6.2	100	100
7.7	113	115
9.8	119	125
12.5	122	129
15.0	125	134

Fig. 4 shows the data on indicated mean effective pressure for compression ratios from 6.2 to 1, to 15 to 1. The very high ratios were in the range of commercial diesel engines. Tests were run from 1,000 to 3,000 r.p.m. which was the practical high speed limit for this particular single cylinder operation. Table 1 shows indicated mean effective pressures at 2,000 and 3,000 r.p.m. expressed in terms of per cent increase over values at 6.2 to 1. Only the indicated values are given since the brake values are influenced by the inherent high friction of a properly balanced high speed single cylinder engine.

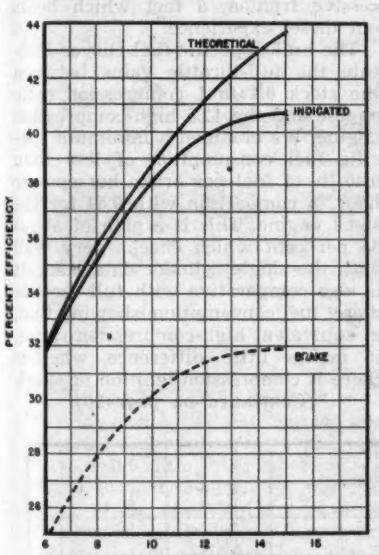

Fig. 6—Chart indicating improvement in efficiency with increased compression ratio for single cylinder high-compression engine

These data show the increase in output as the compression ratio was increased, although the rate of increase became less at higher compression ratios. This was confirmation of an already well-established principle and constituted a method of determining the size and compression ratio of the cylinder which was to be used in the six-cylinder engine.

Fig. 5 illustrates the effect of changing the compression ratio upon the full throttle indicated specific fuel consumption over the speed range studied. Part throttle tests show similar large decreases with increase in compression ratio.

Fig. 6 shows the improvement in efficiency as the compression ratio is increased. It is interesting to note that the indicated thermal efficiency obtained on the single-cylinder engine followed the theoretical* very closely up to 12.5 to 1. Increasing heat losses beyond this value in the engine probably account for the lower indicated efficiencies at ratios of 14 and 15.

The brake thermal efficiency increases rapidly to about 12.5 to 1 and then levels off. In the engine type as represented by this single-cylinder engine, most of the gains of high-compression ratios are obtained at 12.5 to 1. This leveling off of the increase in efficiency is more pronounced in the brake thermal efficiency curves, as would be expected.

Other factors which are of interest in high-compression ratios and which greatly influence the mechanical design of the engine are the peak pressures obtained at various compression ratios. One could hardly expect to design a high-compression engine unless one knew what the peak pressures were. Fig. 7 shows peak firing and compression pressures obtained on the single-cylinder engine plotted against compression ratio. A research laboratories electric-engine indicator was used to obtain these data.[8] As the compression ratio increases, the peak firing pressure increases rapidly from 580 psi. to 6.2 to 1,230 psi. at 15. At a compression ratio of 12.5 the peak pressure was 1,150 psi. These high pressures are in the diesel range, and indicated the need for adequate rigidity if the engine is to run as smoothly as lower pressure engines.

If the compression ratio of an engine of 6½ to 1 were raised to 10 or 12 to 1, little gain in power and efficiency should be expected due to the internal friction which is brought about by their lack of rigidity. Roughness, increased friction and other mechanical problems tend to counteract any gains from high-compression ratios.

A third curve in this figure shows the decrease in the exhaust temperatures with increase in compression ratio which is consistent with diesel practice. This illustrates the lower heat loss in the exhaust gases in high-compression engines.

Six-Cylinder Engine

The tests on the high-compression single-cylinder engine plus diesel experience gave the basic data for designing and building a six-cylinder

*The upper curve shows the theoretical gain in indicated efficiency as compression ratio is increased according to the curve represented by the equation

$$E = 1 - (1/r)^{n-1}$$

where r is compression ratio and n is the ratio of specific heats of the working fluid. In this case n = 1.21 was assumed, a value which lies somewhere within the range of specific heats of the gases in the cylinder.

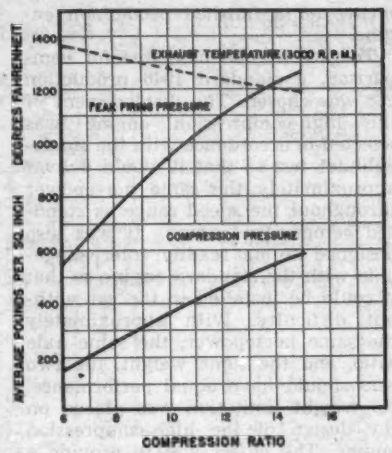

Fig. 7—Compression and firing pressures of single-cylinder high-compression engine

engine which could be installed in a car. The compression ratio chosen was 12.5, because the single-cylinder data had shown that most of the gains in efficiency on this cylinder construction could be obtained at this ratio. The plan was to build an engine which would operate at this ratio and still be as acceptable to the drivers as current engines. This would then show that it would be possible to use such high-compression ratios in an automobile engine when the fuels are at the gas station. If, when new engine designs are made, the economics of higher compression ratios are taken into consideration, these engines can always be adapted to the current available fuels. As suitable fuels became available, the compression ratio could be increased without other major engine changes. This would make for large savings in tooling costs on new engines. In short, we wanted to determine what the foundation had to be to carry the maximum loads the engine would ever be asked to carry. This engine is considered a long range experi-

TABLE 2—COMPARISON OF HIGH-COMPRESSION AND PRODUCTION ENGINE

	12.5 C.R.	1946 engine
Number of cylinders	6	6
Valve arrangement	Overhead	L-Head
Bore and stroke	3⅜ x 3⅜	3½ x 4⅛
Displacement, cu. in.	181	238
Compression ratio	12.5	6.4
Compression pressure at 2,000 r.p.m., psi.	420	165
Peak pressure at 2,000 r.p.m., psi.	1,150	525
Engine torque at 2,000 r.p.m.	154	163
Mech. efficiency at 2,000 r.p.m., %	85	81.5
Maximum b.h.p., r.p.m.	95 at 3,600	85 at 3,400
Minimum brake sp. fuel, r.p.m.	.40 at 2,000	.54 at 2,000
Miles per gal. at 40 m.p.h.	26.5	18.5
Heat rejection to water—B.t.u./b.h.p./min.	31.5	45.5
Rear-axle ratio	3.63	3.63
Car test weight, lb.	4,110	4,110

ment, not a finished production engine.

To give a good base line for comparison, a standard 1946 production car was chosen. The displacement of the high-compression engine was selected in accordance with the single-cylinder test so that it would deliver approximately the same horsepower throughout the speed range as standard comparison engine. It was also designed to be readily interchangeable with the standard engine so that it could be installed in the car without difficulty. With approximately the same horsepower, the same axle ratio, and the same weight, the two cars should have equal performance. No weight limitation was placed on the design of the high-compression engine. The object was to provide a mechanically sound test engine in which weight could be considered later.

Table 2 shows a comparison of the high-compression and 1946 stock production engines as to specifications and performance factors. While it was planned to use triptane as fuel for the early work on the six-cylinder engine, a compression ratio high enough to require triptane was not used. The ratio was chosen to obtain the greatest practical part of the gains of high-compression ratio as indicated by the single-cylinder tests. If we had been building a triptane engine the ratio would have been considerably higher—probably 15 or 16 to 1.

The engine was designed according to rather conventional procedures except that it was made rigid enough to carry the higher loads imposed. Our wide diesel experience helped greatly on this problem because the stresses involved are comparable. After we found that there were no special difficulties from roughness and high friction on the first experimental engine, we made a second experimental design which follows conventional practice. This new engine

TABLE 3—HEAT BALANCE COMPARISON

	High-compression engine		1946 production engine	
	1,000 r.p.m.	3,000 r.p.m.	1,000 r.p.m.	3,000 r.p.m.
Part of fuel heat in f.h.p., %	3.5	8.2	3.5	7.9
Part of fuel heat in b.h.p., %	33.2	32.8	24.9	23.3
Part of fuel heat in water, %	30.1	24.2	29.1	25.4
Balance of fuel heat, %	32.2	34.8	42.5	43.4

was designed from our experience in the high-compression project on both the single and original six-cylinder engine and weighs no more per horsepower than stock engines.

A comparison of the full throttle corrected power, brake mean effective pressure, and volumetric efficiency for the high-compression and 1946 stock production engine is shown on Fig. 8. The horsepower of these two engines was comparable and the slight differences are shown on the curve. The brake mean effective pressure is, of course, very much higher on the high-compression engine at all speeds for it is only 181 cu. in. displacement compared with 238 cu. in. on the stock engine. Volumetric efficiency of the high-compression engine is as good or better than the stock engine at all speeds, showing that there is no restriction to engine breathing. The large gains in brake mean effective pressure are a measure of the gains in specific output. The stock engine has a maximum brake mean effective pressure of 109 psi. at 1,250 r.p.m. and the high-compression engine a maximum brake mean effective pressure of 130 psi. at 1,750 r.p.m. These tests were made in the "as installed" condition with muffler, tail pipe, and all accessories and corrected for barometer, temperature and humidity according to our own engine test code.

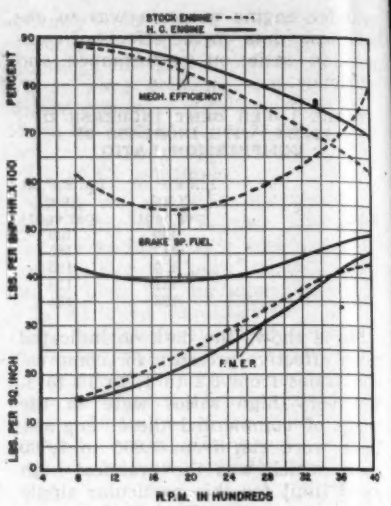

Fig. 9—Engine-performance curves

Fig. 9 shows further comparisons of the full-throttle performance of the two engines. Friction mean effective pressure and mechanical efficiency are both improved on the high-compression engine without excessive friction, a fact which bears out diesel experience.

The brake specific fuel curves indicate the full-throttle gains between the stock 6.4 to 1 compression ratio engine and the 12.5 high-compression engine. We obtained a minimum specific fuel consumption of less than 0.40 lb. of fuel per brake horsepower hour in comparison with 0.54 for the stock engine. This is a gain of about 35 per cent which checks very well with the single-cylinder data tests. It is also comparative with full-throttle diesel fuel consumption, showing that, at equivalent high-compression ratios, it makes little difference whether there is compression ignition or spark

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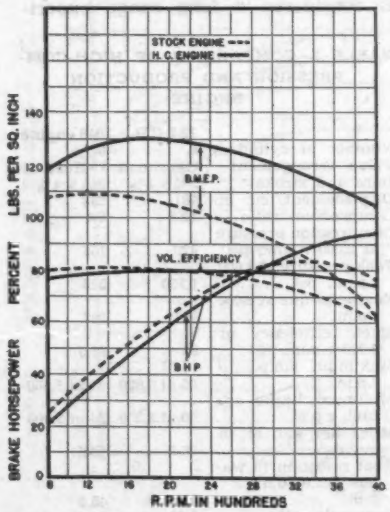


Fig. 8—Engine-performance curves

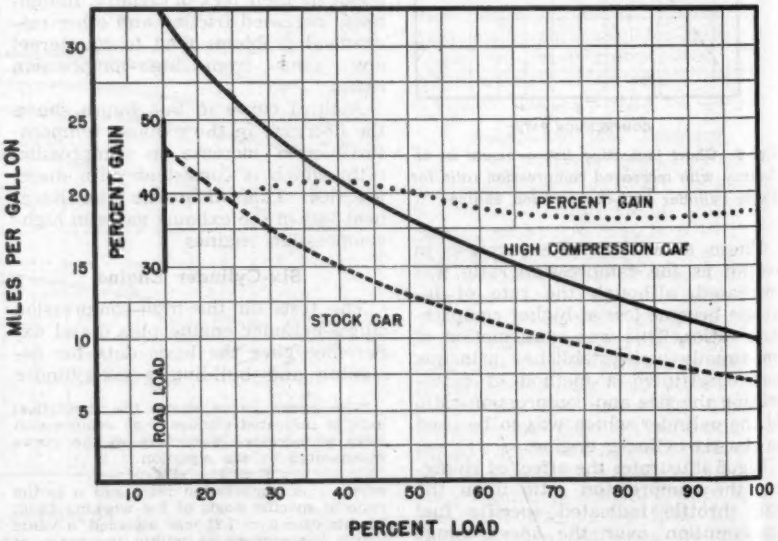
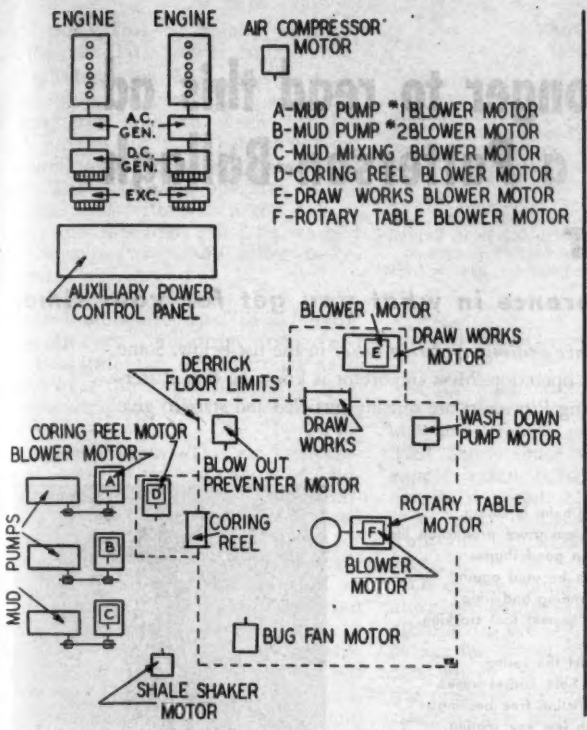


Fig. 10—Comparison in economy at fractional loads of 40 m.p.h.



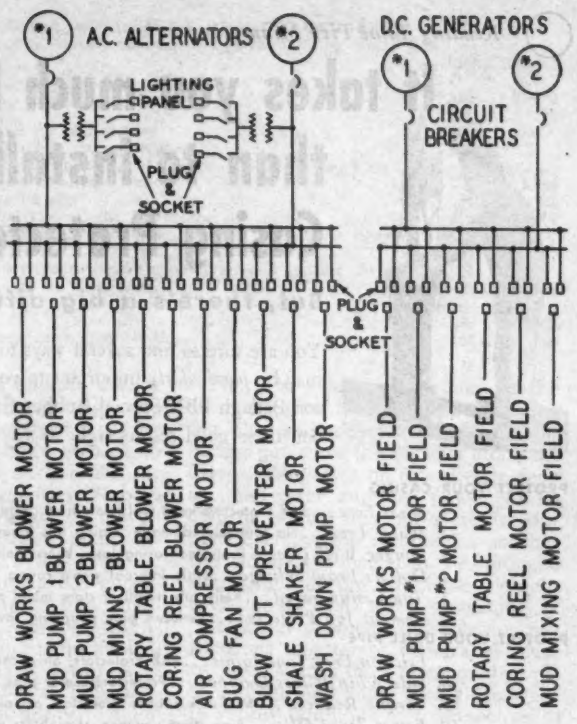


Fig. 1—(Left) Layout of auxiliary equipment on typical drilling rigs. Fig. 2—(Right) One-line diagram of auxiliary power for drilling rig

A. C. Auxiliaries for

DIESEL-ELECTRIC DRILLING RIGS

by I. N. Poore*

DIRECT-CURRENT-MOTOR main drives with variable voltage control are being applied more and more to oil-well drilling rigs where a high degree of maneuverability and flexibility of rig operation are required. With wells being drilled deeper and deeper, the oil industry has become aware of the advantages afforded by the use of electric drives.

However, there are a number of auxiliaries, such as blowers, pumps, and lights which are essentially constant speed, and the flexibility of direct-current power is not required.

It is the purpose of this article to point out, from an economic as well as an operating standpoint, the facts about a.-c. and d.-c. auxiliary equipment so that the reader can readily judge just which of the two methods will better satisfy his requirements.

Auxiliary Drives

The auxiliary load on a typical diesel-electric oil-well drilling rig for deep drilling includes the following:

TABLE 1—A-C AUXILIARY POWER

Motor drive—	Approx. load
Draw-works blower motor	7½ hp.
Mud-pump No. 1 blower motor	7½ hp.
Mud-pump No. 2 blower motor	7½ hp.
Mud-mixing pump blower motor	3 hp.
Rotary-table blower motor	5 hp.
Coring-reel blower motor	5 hp.
Wash-down pump motor	5 hp.
Shale-shaker motors	6 hp.
Air-Compressor motor	5 hp.
Blowout-preventer motor	2 hp.
Bug-fan motors	4 hp.
Total	57½ hp.
Lighting	7½ kva.

D-C Auxiliary Power

Motor excitation—	Approx. load
Draw-works motor	4.125 kw.
Mud-pump No. 1 motor	3.125 kw.
Mud-pump No. 2 motor	3.125 kw.
Mud-mixing pump motor	1.375 kw.
Rotary-table motor	2.625 kw.
Coring-reel motor	2.625 kw.
Total	17.000 kw.

Fig. 1 shows a layout of the auxiliary equipment on a typical diesel-electric drilling rig.

The functions of these various auxiliaries are:

Blower motors.—All main d.c. driving motors are normally separately ventilated, usually by means of a motor-driven blower mounted on top of the main motor. The blower motor is usually explosion-proof, and the separate ventilation afforded for the main motors allows smaller, lighter-weight motors to be utilized for the various drives. Also, by keeping the inside of the main motors under some air pressure, any gas that might escape from the well is prevented from seeping into the motor, especially around the commutator where possible sparking could cause an explosion. The blower motors are normally operated from the auxiliary power supply.

Motor excitation.—The main d.c. motors require a separate source of direct-current excitation for the mo-

*Petroleum specialist, Dallas office, General Electric Co.

Reading Time Five Minutes:

It takes you much longer to read this ad than to install a Patterson-Ballagh Casing Protector

But, there's a big difference in what you get for your time!

You are sure to find several ways to *save drilling operation losses* in the list below. Some may be *particularly* important to your operation. Most important is knowing that Patterson-Ballagh PBX Special Rubber Casing Protectors are quickly installed and start to give you these good results right away.

PROTECT YOUR CASING

1. *Wear Free* . . . PBX Protectors keep tool joints from grinding holes in casing.
2. *Water Free* . . . No tool joint damage, casing has longer leak-proof production life.
3. *Longer Well Life* . . . Protected casing lasts, keeps hole in good shape.
4. *Dollars From Salvage* . . . Little internal wear; casing can be used again.
5. *Top Casing Saved* . . . Kelly sub stabilizer stops metal pounding and whip.
6. *Cement Job Protected* . . . Reduced pipe pounding saves cement seat cracking.

PROTECT YOUR DRILL PIPE

7. *Friction Free Tool Joints* . . . PBX Protectors, only, contact the casing.
8. *Side Whip Waves Damped* . . . Protectors center pipe in hole, cancel waves.
9. *Torque Reduced* . . . Mud-slick rubber Protectors act as friction free bearings.
10. *Fewer Twist Offs* . . . Pipe stays younger, straighter; with less key seating.
11. *Rethreading Seldom* . . . Torque free joints don't spin-back, kick loose, wobble.
12. *Kelly Grief Avoided* . . . Kelly sub stabilizer prevents whip and slide wear.
13. *More Hole per Joint* . . . Fewer stress cycles delay fatigue failures . . . pipe lasts.
14. *Less "Soft" Pipe* . . . Protectors reduce vibration, corkscrewing; less "bent pipe."
15. *Mud-Ringing Danger Curbed* . . . Lip on Protector prevents corrosive mud collecting.
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17. *Stall Shocks Reduced* . . . Rubber reduces power shocks, vibration.
18. *Draw Works Saved* . . . Smoother running of pipe in and out of deep holes saves wear.
19. *Wire Lines Saved* . . . Protectors damp vibration and help cushion the line loads.
20. *Mud Program Helped* . . . Protector sizes designed to permit safe, free circulation.
21. *Truer Weight Indication* . . . Less vibration saves indicator; free pipe weighs truer.
22. *Fewer Bit Troubles* . . . Protected, smooth running pipe reduces bit pounding.
23. *Fewer Table Troubles* . . . Reduced pipe whip saves table shock and damage.
24. *Less Derrick Strain* . . . Lower power loading due to less friction reduces strains.

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25. *Straighter Drilling* . . . Protectors act as guides; directional control surer.
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tor fields. This is usually supplied by the auxiliary power source.

Wash-down pump. — The wash-down pump is generally used on a drilling rig both to clean off the drill pipe when it is removed from the well and to cleanse the derrick floor. The drill pipe operates in the drilling mud with which the hole is filled, and this mud must be washed off the pipe when the latter is removed.

Shale-shaker motors. — The shale-shaker motors are used to drive the shale-shakers (vibrating screens) which agitate the drilling mud as it passes over the screen for the purpose of removing the drill cuttings from the mud.

Air compressor.—The air compressor is used to supply a source of compressed air for starting the main engines, for operating the air-operated clutches on the draw works, and for other miscellaneous uses on the drilling rig.

Blowout preventer.—The blowout preventer is used in emergencies or during periods of drilling through strata where high underground gas pressures exist. It seals off the annular space between the drill pipe and the casing so as to prevent a blowout of the mud and the drill pipe in the well due to the high-pressure gas underground. The equipment is normally hydraulically operated, and a motor-driven pump is required to supply the operating oil pressure.

Bug fans.—The bug fans are used at times during night drilling, especially along the Gulf Coast, where the rig lights tend to attract insects, which annoy the drilling crew.

Conventional Means of Providing Power for Auxiliaries

Heretofore it has been common practice on diesel-electric drilling rigs to supply d.c. auxiliary power by means of a belt-driven, constant-voltage d.c. generator mounted on top of each main generator. Also, with the advent of the new G-E electro-hydraulic engine governors, which allow the engines to operate over a 2:1 to 3:1 speed range, auxiliary d.c. generators were supplied as thyrite-controlled generators so that the voltage and kilowatt output could be held relatively constant over the speed range of the engine-generator set.

On a normal diesel-electric drilling rig for deep drilling, which utilizes three engine-generator units, there are three constant-voltage auxiliary d.c. generators required, either constant speed or variable speed thyrite-controlled, one mounted on top of each main generator to supply sufficient auxiliary power. These auxiliary generators are approximately 30 kw. in size, each of which requires about 46 hp. from the engine in addition to the engine horsepower required for driving the main generators.

TABLE 2—A.C. AUXILIARIES VS. D.C. AUXILIARIES
(Economic Comparison for a Typical Drilling Rig)

Equipment—	List prices—D.C.	List prices—A.C.
Auxiliary motors	$7,334	$1,990
Auxiliary control	4,781	923
Three 30-kw. constant-speed d.c. generators	2,883	.....
Control for three constant-speed d.c. generators	1,600	.....
Two auxiliary generator sets consisting of: 60-kw. a.c. gen., 20-kw. d.c. gen. and 2-kw. exciter, all 900-r.p.m. speed	.....	5,608
Control for a.c.-d.c. generator sets	.....	2,200
Two 130-hp. engines for driving a.c.-d.c. generator sets	.....	12,000
Saving of 46 hp. from each main engine, or total of 138 engine horsepower, at $50 per hp.	6,900	.....
7½-kw. aux. engine-gen. set (used during rigging up and tearing down)	900 (approx.)	Not needed
Total	$24,398	$22,721
Total cost on percentage basis (per cent)	108	100

If the main engines operate over a two or three-to-one speed range, the auxiliary thyrite generators must be used. These must be large enough to supply rated output at one-half or one-third speed: Hence they become large and cumbersome when driven from the adjustable speed main engines.

Of course, small thyrite d.c. generators for supplying lights and small auxiliaries are still a proper application for diesel-powered mechanical rigs where the auxiliary power is of the order of 7½ to 15 kw. This article, however, does not apply to them but to the very large diesel-electric rigs where the auxiliary power becomes of the order of 75 to 100 kw.

Power Supply for A.C. Auxiliaries

There are numerous advantages to a.c. power for the auxiliary drives on diesel-electric drilling rigs. The a.c. power supply can be obtained from a separate small engine-generator unit which consists of an internal-combustion engine suitable for continuous duty at full-connected generator rating; an a.c. generator, 3-phase, 480-volts, 60-cycles, for the lighting and auxiliary drives listed in Table 1; a d.c. generator, 250-volts, compound wound, self-excited, direct connected to the a.c. generator for supplying excitation for the main d.c. motor fields; and a small direct-connected d.c. exciter, 125 volts, for supplying regulated excitation to the a.c. generators.

Two of these engine-generator sets can be used on each drilling rig, either one of which would be large enough to supply all of the auxiliary power, allowing the other unit to be used entirely as a spare. Both of these engine-generator units might possibly be mounted on a single skid if desired.

A separate auxiliary control panel can be used for controlling the a.c. and d.c. generators. This control panel contains two feeder buses for the a.c. auxiliary power. All auxiliary connections to these feeders can be made by means of coupler plugs and sockets of suitable size for the various auxiliary loads listed above. In addition, there are two d.c. feeder buses with coupler plug and socket connections for supplying the motor field excitation.

Fig. 2 is a one-line diagram of the auxiliary power connections, showing the plug-and-socket arrangement for taking power to the various auxiliary drives. As shown on this sketch, each a.c. generator supplies power to its own individual bus and there are duplicate connector receptacles so that the auxiliary load can be plugged into either of the two buses, whichever one happens to be energized.

It is not deemed advisable for oilfield use to attempt to parallel these two generators on a common bus. It is simpler and more straightforward to supply double-socket connectors so that either generator, operating independently, can supply power to any or all of the connected auxiliary loads. This same feature is incorporated for the d.c. generator for supplying power to the main motor fields.

A.C. vs. D.C. Auxiliaries Economic Study

From an economic standpoint, it might seem at first glance that purchasing separate engine-generator units for a.c. power supply would mean a higher first cost of the diesel-electric drilling equipment. However, Table 2 shows the saving in first cost that can be made if a.c. auxiliary power is utilized.

Table 2 is based on the auxiliary power required for the typical diesel-electric drilling rig, listed in Table 1. A 60-kw., 75-kva., 0.8 pf., 480-volt, 3-phase, 60-cycle, a.c. alternator is required to supply all of the tabulated auxiliary motor drives and lighting of Table 1. A 20-kw., 250-volt d.c., compound-wound, self-excited, d.c. generator is required to supply the field excitation for the various main motor drives. An engine with a rating of approximately 125 to 130 hp. is required to drive the a.c. and d.c. generators. The cost of these engines is estimated at approximately $46 per horsepower.

The approximate average value of $46 per horsepower for engines is based on known prices of engines ranging from about 90 to 720 hp. in size. The prices vary from $22 to $65 per horsepower according to type and size of engine.

To give a direct economic comparison between a.c. and d.c. auxiliaries,

(Continued on page 87)

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it is assumed that with a normal three-engine generator drilling rig, three 30-kw., 125-volt d.c. constant-voltage, constant-speed generators—one mounted on each engine-generator set—would be required to supply this auxiliary power if it were all direct current.

The assumption that three 30-kw. constant-voltage d.c. generators would be required is based on the fact that the total auxiliary lead would be divided about equally among the three generators which would not be paralleled. Also in the event that one main engine-generator set is shut down for any reason, two of the three 30-kw. d.c. generators could supply the essential auxiliary load.

A saving of 46 engine horsepower on each main engine would be realized if a.c. auxiliaries were utilized instead of the 30-kw. d.c. constant-voltage generators, and, consequently, this engine horsepower saving at the rate of $50 per horsepower was charged against the d.c. auxiliary power system.

Auxiliary Needed

Furthermore, all drilling rigs normally have a small auxiliary engine-generator set ranging from 5 to 10 kw. in size, to be used for rig lighting and other operations during rigging-up or tearing-down time when the main engine-generator units are not in use. In the case of d.c. auxiliary power supply, if the main engine generators were not in use, the auxiliary constant-voltage generators would not be in use. Therefore, this small auxiliary engine-generator set would be required. Consequently, its cost is chargeable against the d.c. auxiliary power system.

The prices of explosion-proof d.c. motors and control are considerably higher than the same size explosion-proof a.c. motors and control.

Adding up the two columns in Table 2, we find a saving of 8 per cent in the cost of equipment for a.c. power as compared with d.c. power for the auxiliaries. Therefore, from this analysis of the economics of these two methods, it can be seen that a.c. auxiliaries definitely result in a more acceptable auxiliary power system for use on electric drilling rigs.

In addition to the saving in first cost for a.c. auxiliaries, there are numerous other advantages obtained:

1. The main engine-generator unit assemblies are simplified, lighter, and easier to move and set up, because of the elimination of the top-mounted, belt-driven, constant-voltage d.c. generators.

2. The main d.c. control panel is considerably reduced in size, weight, and first cost, using a.c. auxiliaries.

3. Smaller main diesel engines are required, since they will have to drive only the main variable-voltage d.c. generators. If separate engines are used for auxiliaries, more power will be available for the main motors.

4. The a.c. auxiliary power set would be available for lighting, auxiliary motor drives, electric tools, etc., when the rig is being set up or dismantled, without operating the main engine-generator units.

5. The generators supplying power to the motor-driven auxiliaries and lighting are separate from the generators supplying d.c. power for excitation of the main motor fields.

6. Power distribution to the auxiliary motor loads are improved when using 480-volt, 3-phase, a.c. power instead of 125-volt d.c. power, since it permits the use of smaller cables or locating motors at greater distances from the power source.

7. A.c. squirrel-cage induction motors are much simpler, lighter in weight, and less expensive in the explosion-proof design than d.c. motors of comparable size.

8. The relatively large, expensive, and heavy d.c. motor starters can be replaced with small, simplified, low-cost, across-the-line a.c. starters, which require less maintenance.

9. Normally, the availability of small three-phase a.c. motors is greater than small d.c. motors, so that in the event of trouble with one of the auxiliary motors, a replacing motor could be more easily obtained.

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10. A disadvantage of separate engine-driven sets for supplying a.c. auxiliaries is that such separate engines have to be maintained.

Therefore, two duplicate sets, each capable of carrying the entire auxiliary load, are proposed.

Sohio's 1 Howard

(Continued from page 68)

two whipstocks in order to straighten the hole. It was extremely difficult to keep the hole straight and this was controlled primarily by very careful control of the weight carried on the bit and the speed of the rotary table. It was possible to run only 4,000 to 6,000 lb. of weight on the bit, and, as a result, the rate of penetration of the formations was very slow.

While a dull bit was being removed from a total depth of 7,421 ft., the drill pipe stuck in a key seat at around 2,300 ft. Acid and oil were spotted in an effort to loosen the pipe but these efforts were unsuccessful. The drill pipe was cut off above the drill collars. After an extended fishing job, the hole was cleaned up with the exception of one drill collar which was left lodged in the side of the hole at approximately 2,300 ft. and which was subsequently cemented off.

At 7,816 ft. it was necessary to run a protection string of casing, and the hole was reamed to 9⅞ in. While reaming down, the bit drilled out of the old hole and some new hole was drilled. This reaming, drilling new hole, running the 7⅞-in. protection string, and waiting for cement to set took approximately 1 month. A 6¾-in. hole was drilled to 10,234 ft. After a series of successful drill-stem tests, 5½-in. casing was run and set at 10,046 ft. After landing the casing string, it was impossible to get complete returns around the 5½-in. casing and it was deemed advisable to cement the casing by spotting 75 sacks on bottom through 2½-in. tubing and then closing the annulus between the tubing and casing. This cement job was tested by perforating with 10 holes from 9,992 ft. to 10,001 ft. These tests indicated a successful job, since no fluid came into the casing nor could fluid be forced out of the perforations with nominal pressure. The plug was drilled and the hole cleaned out to bottom with a 4½-in. rock bit on 2½-in. tubing.

TABLE 5—SUMMARY OF BIT RECORD

Size—	No.
Bits	
9 -in.	122
9⅞-in.	2
7⅞-in.	1
6¾-in.	107
4½-in.	2
Total	234
Pilot Bits	
13¾-in.	1
9⅞-in.	4
Total	5
Core Heads	
7½-in.	2
7 -in.	2
6½-in.	12
6¼-in.	2
Total	18
Grand total	257

The bit was pulled and a perforated anchor suitable for bottom-hole pressure equipment was run on the bottom of the 2½-in. string of tubing. The mud was circulated out of the hole with water, and water was swabbed out through the tubing. After removing approximately 1,000 ft. of water in this manner, the well kicked off and cleaned itself.

The maximum rate that this well has been flowed was slightly over 100 bbl. per hour through a 1⅛-in. tubing choke. Gas-oil ratios were, and have been, about 1,000 cu. ft. per barrel. The oil is just over 40° A.P.I. gravity. A completion allowable of 500 bbl. per day for testing purposes was granted by the Oklahoma Corporation Commission until the first of April. Since that date, the allowable has been 400 bbl. per day.

The well makes its allowable through a ¼-in. choke with approximately 900 psi. tubing pressure and 2,500 psi. on the casing. Cumulative pipe line runs to May 1, 1947, were 47,163 bbl. of oil.

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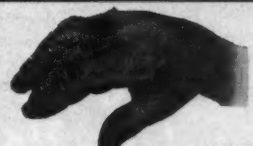

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(Continued from page 78)

ignition. Both types of engines give high full load fuel economies.

Table 3 is a table of the heat balance comparison of the stock and high-compression engine at 1,000 r.p.m. and 3,000 r.p.m. Throughout the speed range the high-compression engine loses less heat per horsepower through the exhaust and cooling water, and more is utilized in producing power.

Curves in Fig. 10 were calculated from data on the stock engine and show the relation between miles per gallon and per cent load at 2,000 r.p.m. or, in this case, 40 m.p.h. Fig. 10 is included to illustrate a very important characteristic of the economy gains resulting from higher compression ratio. The gains are consistently large throughout the entire load range. Similar dynamometer data taken at other speeds show the same tendency to maintain the economy gains at all throttle positions. From this it was concluded that the high-compression

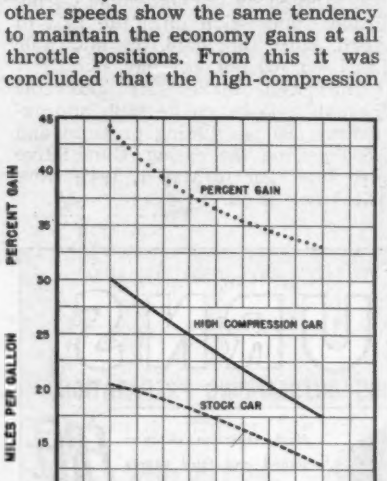


Fig. 11—Comparison of constant-speed, level-road economy

engine should show these large gains in economy on road tests under all driving conditions. All of the dynamometer data, both full and part throttle, have shown considerably lower fuel consumption at all speeds and loads.

Road Tests Six-Cylinder Car

It is difficult to predict from dynamometer tests how an engine will react under the widely varying requirements of car operation. Roughness, general performance, driving economy, flexibility, and other factors can only be determined in a car on the road. An engine in a car is the final proof. The six-cylinder, high-compression engine was installed in one of two of the same model stock automobiles, both equipped with

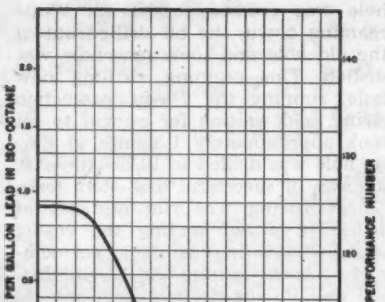


Fig. 12—Antiknock requirement of high-compression car

Hydra-Matic transmissions. These two cars, the one with the standard engine and the one with the high-compression engine, have been run on comparative road tests for many months. Both the car with the standard engine and the high-compression engine give normal, smooth operation. A short drive shows that the performance and feel are just about the same as a production car, and it is impossible to tell from driving the two cars which one is which, except at high speeds where the high-compression car is somewhat faster. It should be remembered that the output of the high-compression engine was made to match the same performance as the standard engine. The factor that cannot be demonstrated on a short run in the car is the greatly increased economy.

Fig. 11 shows a comparison of constant-speed, level-road economy of the high-compression and standard cars.

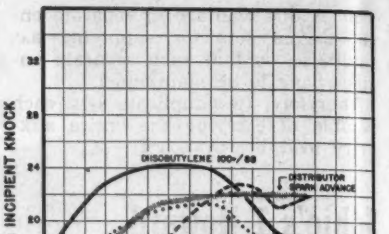


Fig. 13—Knock characteristics of fuels in high-compression car

These data show that, under these conditions, the high-compression car gives from 35 to 40 per cent better economy in miles per gallon than the standard car. At 40 m.p.h. the standard car has a fuel economy of 18.5 m.p.g. while the 12.5 compression ratio car has an economy of 26.5 m.p.g., an improvement of approximately 40 per cent. At 60 m.p.h. the saving is 35 per cent. While these data are important from an engineering standpoint, they give only part of the story because automobiles are not driven on level roads at constant speed very much of the time. Approximately two-thirds of the gasoline is consumed in city driving where a large percentage of the operation is transient and requires the entire range of the engine.

To determine the actual gain in economy a number of cross-country

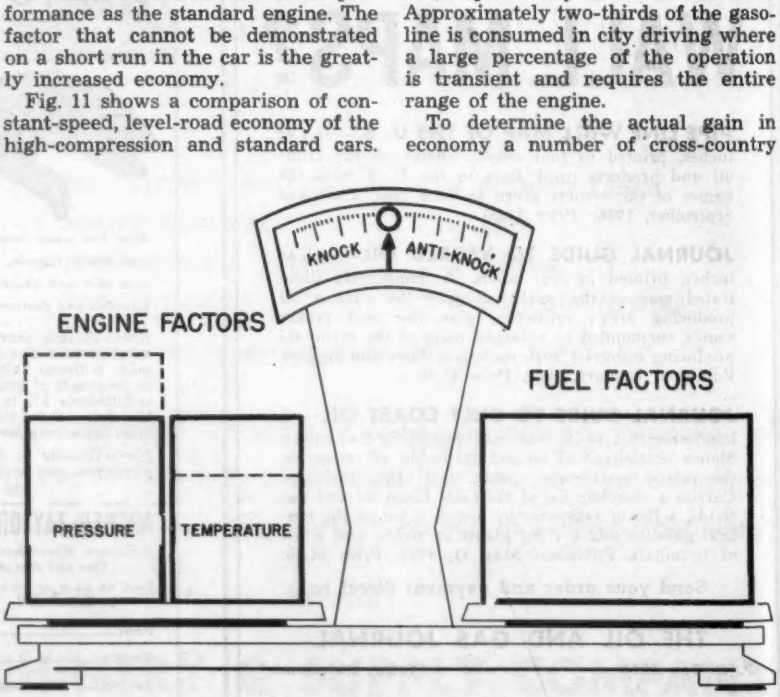


Fig. 14—Diagram indicating flexibility in balancing engine design with available fuels

trips were made where both cars were driven together under the same speed and traffic conditions. On a large number of such trips under widely varying road conditions the average gain in economy was about 33 per cent. Where the maximum speed was held below 50 m.p.h. the gain was 35 per cent. In the same test made with the maximum speed limited to 70 m.p.h., the gain was 33 per cent. Several extended trips made entirely in city traffic show gains of over 40 per cent, which is of major importance in view of the large quantity of fuel burned under these conditions.

Many of the preconceived troubles which were expected failed to materialize after the engine was running. Engine roughness was eliminated by proper structural design. With some modification of the ignition coil winding and core material, conventional 6-volt ignition has proven adequate on this engine. Cold starting has not been a problem at temperatures encountered in the Detroit area during the past winter. It was thought that the effect of combustion chamber deposits might become critical at high-compression ratios. Almost 10,000 miles of driving with a leaded fuel has failed so far to develop any trouble.

Antiknock Requirements

When we started our experiments we wanted to be able to make an appraisal of the long-range possibilities of high-compression, spark-ignition engines with complete freedom from limitations imposed by detonation. Triptane was selected for the early work on this program because this fuel had the requisite freedom from knock up to 15 to 1 compression ratio and it would permit the evaluation of the influence of various engine factors on engine operation without the complications introduced by engine knock. Triptane was used for the single-cylinder studies and for our early tests on the six-cylinder engine both on the dynamometer and on the road.

At the completion of these preliminary tests we naturally became interested in the determination of the actual antiknock requirements of the six-cylinder engine as measured in terms of the octane number scale. This information was desired in order to get some idea of the approximate requirements of this engine in terms of present-day fuel ratings.

The antiknock requirement of the 12.5 compression engine as installed in the car is shown in Fig. 12. This figure shows that the maximum antiknock requirement was approximately equal to isooctane plus 0.9 ml. tetraethyl lead per gallon.

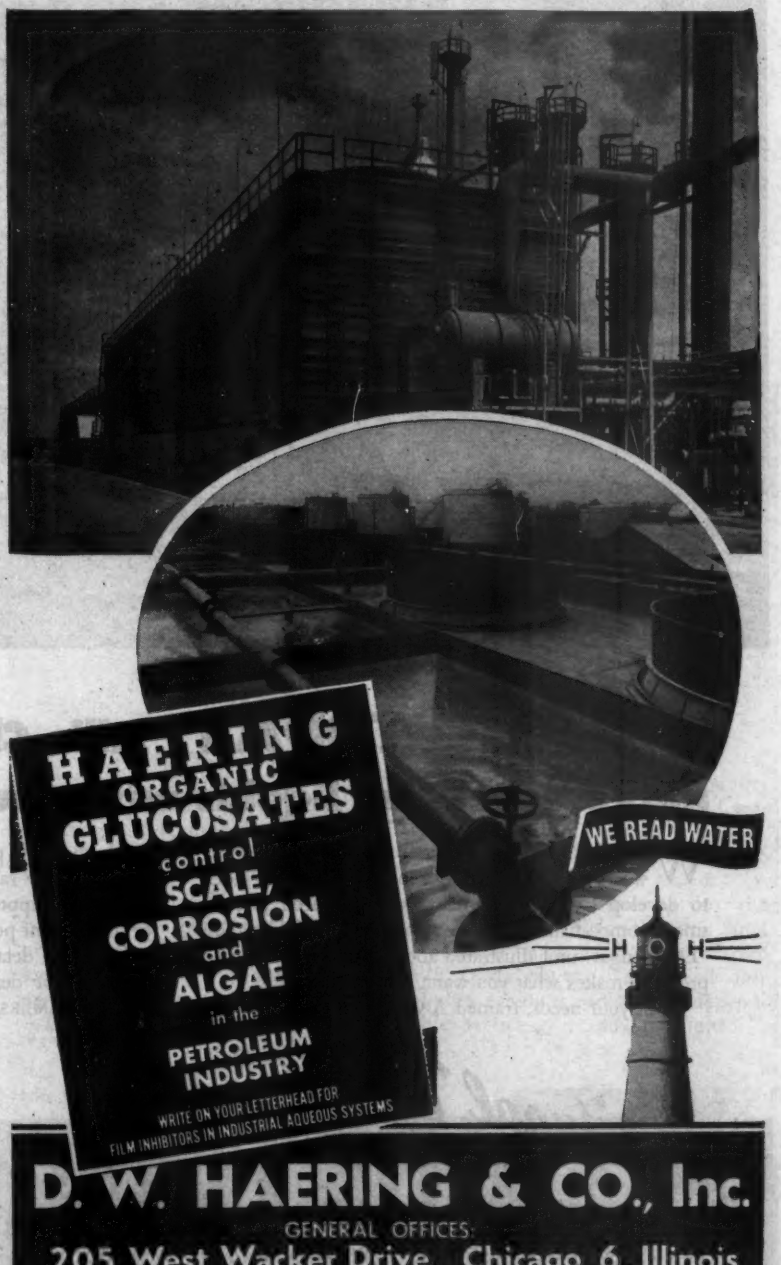
Fig. 13 is a representation of the performance of three widely different types of fuel which may be of interest. Diisobutylene is an extremely sensitive fuel as indicated by its research octane number, equivalent to isooctane plus 0.5 ml. of tetraethyl lead, and A.S.T.M. octane number of 88. Isooctane is a fuel of zero sensitivity by definition, since it is the primary reference fuel. The experimental test fuel was a sensitive type of gasoline which was produced by catalytic cracking and, with 1.5 ml. of tetraethyl lead, had a research octane number of 99 and an A.S.T.M. octane number of 85. It is understood that such a fuel could be made and sold in large quantities at a comparatively small premium.

Fig. 13 illustrates several very significant things about the performance of these three fuels in this engine.

First.—That it is possible to operate this 12.5 compression engine with 99/87 octane number gasoline, although with some slight detonation at speeds above 55 m.p.h.

Second.—That, with comparatively small changes in spark advance, an engine of this type can be operated satisfactory over the entire speed range with a fuel of approximately 99/87 octane number.

Third.—The relatively high ratings of diisobutylene and of the experi-



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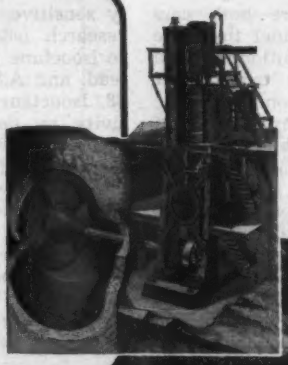

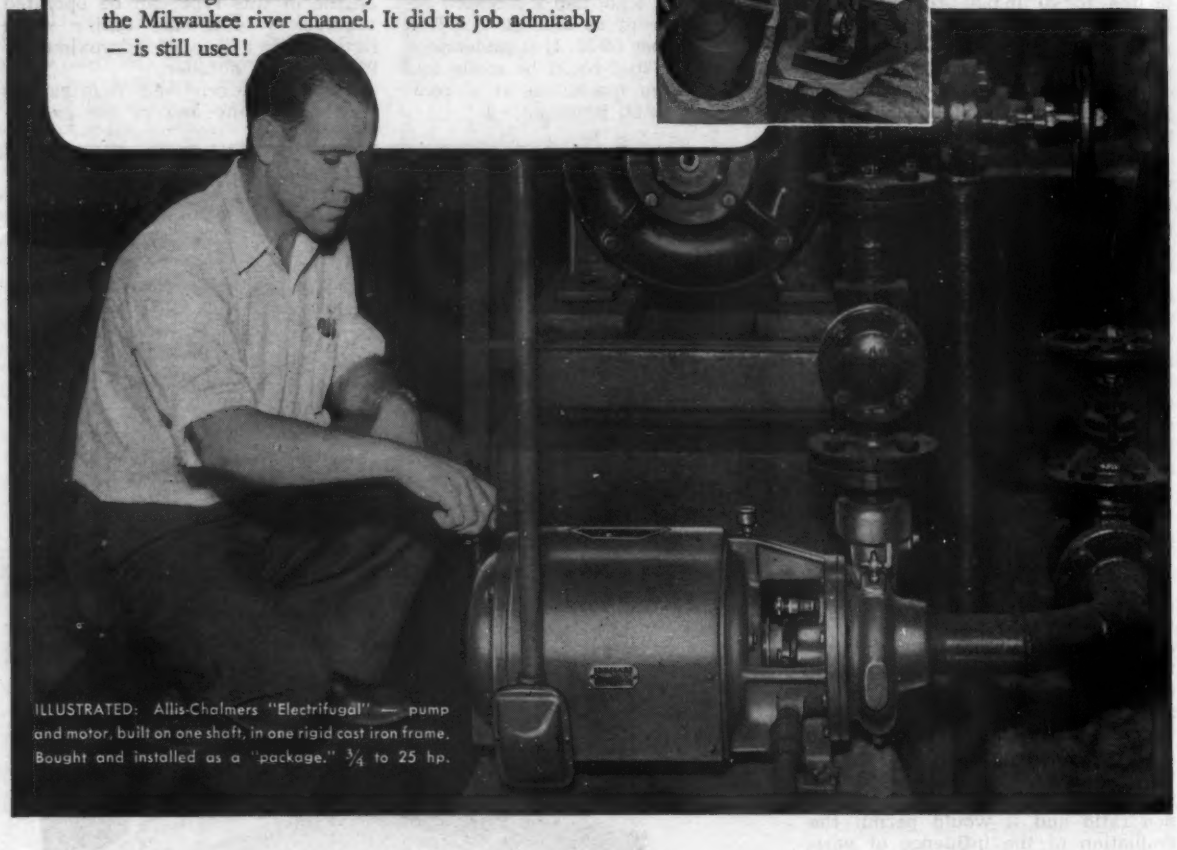

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mental test fuel with respect to isooctane are better than would be expected from the interpretation of the research and A.S.T.M. octane numbers.

Octane Numbers

For the following discussion we might think of the problem of operation of high-compression engines as made up of two kinds of octane numbers: first, are what we might term "chemical" octane numbers; and second, "mechanical" octane numbers. The chemical octane numbers are built into the fuel by refining methods and by the addition of tetraethyl lead. We pay for these octane numbers when we buy the gasoline at the filling station and the responsibility for supplying these chemical octane numbers rests with the petroleum industry.

Mechanical octane numbers are what the engine designer builds into the engine, and they are delivered to the customer when he buys the car. Factors which influence mechanical octane numbers are compression ratio, spark timing, piston temperature, valve temperature, mixture temperature, mixture ratio, valve timing, combustion chamber shape, etc. The idea of mechanical octane numbers is not new, as much work has been done in the last 30 years on combustion chamber design and many other fundamental engine factors. In addition, when an engine is installed in an automobile, transmission characteristics become an important factor that affects octane number requirements.

In this six-cylinder, 12.5 compression engine the mechanical octane numbers have been developed to a high degree, although it is believed that considerable improvement in octane requirements of engine at any compression ratio can be accomplished by attention to these factors mentioned above.

Temperature and pressure are the two important factors which affect knock, and the control of mechanical octane numbers is largely a problem of control of the temperature and pressure relationship of the charge at the time of ignition.

Fig. 14 illustrates the problem involved. The fuel factors must be balanced against the engine factors to obtain efficient nonknocking combustion. The fuel factors which make for high-octane number are the methods of refining such as thermal cracking, catalytic cracking, alkylation, polymerization, and reforming.

References

1. Charles F. Kettering, Fuels and Engines for Higher Power and Greater Efficiency, S.A.E. paper (Jan. 8-12, 1945).

2. C. E. Grinstead, R. N. Frawley, F. W. Chapman, and H. F. Schultz, Jour. Soc. Auto Eng., 52, 534 (Nov. 1944).

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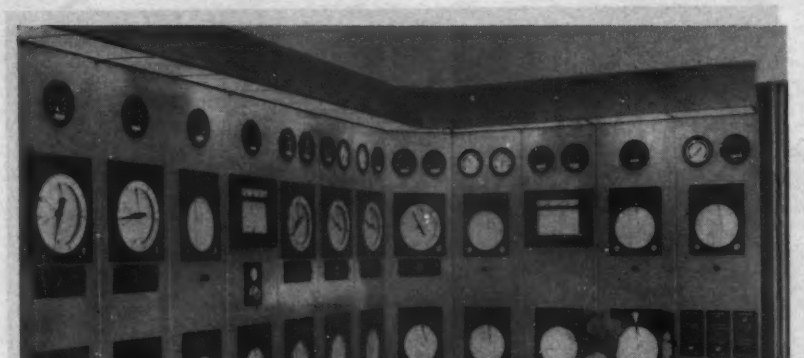

View inside central control room. This section controls the furfural unit, whereas the other half is identical but controls the vacuum unit

Quality of Lubricating Oils Improved

(Continued from page 59)

of dewaxed acid-treated bright stock (165 viscosity SSU at 210° F.). In design and construction, there has been incorporated the latest in technological advances. Many of the features found in earlier units have been eliminated completely or so revised as to be nonrecognizable. It is intended to bring out these pertinent advances as the description of the general process is developed. Essentially, the process (Fig. 1) may be considered as four separate operations: treating, solvent recovery from raffinate mix, solvent recovery from extract mix, and the CBM section where water is removed from the solvent.

Surge Tanks Eliminated

Earlier furfural units employed surge tanks for the raffinate mix and extract mix from the treating tower which was operated at low pressure. On the new plant, these surge tanks with their attendant controls and pumps have been eliminated. The tower is operated under a pressure of 75 psig. which is sufficient to deliver both the extract mix and the raffinate mix to the succeeding steps in the operation.

The treating tower is somewhat taller than required for a unit of this capacity. The top section offers sufficient surge capacity for the raffinate mix. The section between the furfural and oil inlets is the extraction section wherein the solvent, at a temperature sufficiently high to provide some solvent power in addition to its selectivity, removes the extract portion of the oil with considerable raffinate. At the same time, additional raffinate is moving upward from the disengaging section so that eventual equilibrium is reached and treated raffinate enters the raffinate mix surge to the tower outlet. Below the oil inlet is a "disengaging" section. Due to intercooler circulation, the tower temperature is gradually being reduced and the furfural, while retaining its selectivity, loses its solvent power. The raffinate is released to proceed up the column into the treating section. This process is further advanced by the introduction of extract recycle. This material, by increasing the concentration of extract in the solvent, "salts out" the raffinate oil. The bottom of the tower serves as surge capacity to the extract system.

Control of flows to and from the treating tower required a unique instrumentation. Pressure on the treating tower system is controlled by a remote-operated manually set motor valve located in the raffinate mix outlet line from the top of the tower with manual control on the central control board. The valve is, in effect, a fixed orifice in the discharge line from the tower with the pressure drop through the orifice holding the desired pressure on the treating system. The size of the orifice can be changed as required for different charge rates and different solvent ratios. Since the oil and solvent charge rates are regulated by rate of flow controllers, the input and output flows are uniform. Thus, once the manually set pressure control valve is positioned for one set of operating conditions, no further change in the setting is required unless the charge rates, degree of extraction, or type of charge stock are varied.

New Controls Devised

In their passage through the treating tower, the charge oil-solvent mix resolves itself into two layers, a raffinate mix upper layer and an extract mix lower layer. The extract mix is roughly two to three the volume of the raffinate mix. The logical method of discharging the extract mix from the bottom of the treating tower would appear to be by interface level control, but the interface between the two layers is not clearly defined. In order to overcome this difficulty, a new control arrangement was devised. The orifice of a conventional rate of flow controller was placed in the raffinate mix outlet line from the top of the treating tower, and the controlled motor valve was placed in the extract outlet line. The motor valve is reverse acting so a trend to an increasing flow of raffinate mix opens the motor valve in the extract mix line to return the raffinate mix flow rate to the control setting. Since, for any given set of operating conditions, the volumetric ratio of raffinate mix to extract mix is constant, the rates of flow of both mixtures are brought under control at uniform rates.

TABLE 1—TREATING CONDITIONS AND LABORATORY ANALYSES—NEUTRAL OPERATION

	Charge	Raffinate	Extract
Gravity, °A.P.I.	26.5	31.2	11.0
Flash, °F.	410	420	400
Fire, °F.	470	475	460
Viscosity SSU at 100° F.	219.3	180.0	2,226
Viscosity SSU at 210° F.	46.2	45.0	61.85
Viscosity index	76.2	97.0	—34.9
Color	3.5	1.5	2-(½ mm.)
Pour	5	10	5
Con. carbon residue, per cent	0.02	0.008	0.51
Neutral No.	0.02	0.002	0.02
Yield	100.0	80.0	20.0
Treating tower top, °F.	....	230	....
Treating tower bottom, °F.	....	160	....
Solvent dosage, per cent	....	200	....
Recycle extract/chg. oil	....	0.35	....
Tower pressure, psig.	....	75	....

TABLE 2—TREATING CONDITIONS AND LABORATORY ANALYSES—BRIGHT STOCK OPERATION

	Charge	Raffinate	Extract
Gravity, °A.P.I.	23.6	26.5	14.7
Flash, °F.	540	555	500
Fire, °F.	615	625	570
Viscosity SSU at 100° F.	3,508	2,524	13,430
Viscosity SSU at 210° F.	164.5	151.8	225.4
Viscosity index	81.6	95.9	—5.34
Color	6+	6—	Green
Pour, A.S.T.M.	15	20	25
Con. carbon residue, per cent	1.47	0.70	3.09
Neutral No.	0.015	0.005	....
Yield	100.0	80.5	19.5
Treating tower top, °F.	....	290	....
Treating tower bottom, °F.	....	225	....
Solvent dosage, per cent	....	450	....
Recycle extract/chg. oil	....	0.50	....
Tower pressure, psig.	....	75	....

The approximate position of the interface level is recorded on the main control board by remote transmission from a long range displacement type float located in the base section of the treating tower. In addition, gage glasses of clear vision type were provided to aid in determination of the interface level. These were so successful during the operation that it was unnecessary to use the sample draw-off method. Radical changes in the position of the interface indicate the necessity for changing the ratio of raffinate mix to extract mix withdrawal which can be accomplished by resetting the flow controller described above.

Control of the temperature gradient through the treating tower is of utmost importance and offers several interesting instrumentation features. Solvent for recirculation is obtained from the surge capacity in the bottom of "A" fractionator and must be cooled to required temperature. This is accomplished in a shell and tube cooler through which the coolant water circulates at a constant rate. A temperature controller actuates two motor valves; one of which is located in a cooler bypass, and the other in the cooler inlet line. The thermal element is located downstream to the junction of the bypass and the cooled outlet. A trend to temperature increase above the control point decreases the valve opening in the bypass and increases the flow to the cooler. Since the pressure drop through the cooler is relatively small, it was felt that the bypass control would not be effective without, in effect, creating sufficient pressure drop with the second valve. Control of this operating condition by placing the motor valve in the coolant line was not considered due to the possibility of destructive shock pressure (water hammer) in the effluent water line to the cooling tower. Below the oil inlet to the treating tower are two specially designed draw-off wells from which streams are withdrawn and cooled for return to the tower. The rate of flow and degree of cooling removes heat at these points, resulting in a gradual lowering of temperature toward bottom of the treating column. Flow is adjusted by means of flow proportioning needle valves in discharge of the intercooler pumps and manometer type flow indicating meters.

Recovery System Changed

The raffinate recovery system offers another change from earlier units in the omission of a dry solvent flash section. The total raffinate mix is charged directly to the raffinate stripper which has an enlarged section above the flash zone to provide for the relatively large vapor volume. The liquid residue drops into the lower section for steam stripping. The amount of stripping steam required is small and condensation of the steam and solvent together does not greatly increase the size of the CBM system in which the solvent is finally recovered.

The extract mix from the treating tower contains approximately 90 per cent of the solvent circulated, and hence the solvent recovery from this stream is accomplished in three steps. The bulk of the solvent is recovered dry in an atmospheric flash tower, heat for which is supplied by exchange, and a pressure flash tower for which heat is supplied by a direct-fired tube still. The residual solvent is finally removed in extract steam stripper.

The pressure flash tower is equipped with an automatic draw-off arrangement from a total draw-off tray to permit removal of a small stream of down flow liquid. It has been found that small amounts of corrosive organic acid compounds which result from any decomposition of the furfural are concentrated at this point. Withdrawal of a small side stream removes these compounds from the extract recovery system. The side stream is directed to the CBM system where the organic acids are finally discharged in waste water solution while the solvent content of the side stream is recovered for recirculation to the treating tower. The rate of side stream withdrawal automatically controls the volume of reflux to the top of the pressure flash tower by means of a recording flow controller with the orifice in the draw-off line and the controlled valve in the reflux line to the tower. In this manner, the amount of reflux is controlled to give the desired volume of side stream withdrawn. It should be added that the gain or loss in acidity of the circulating solvent determines the adjustment of this control.

Liquid-Level Alarms

The CBM system is conventional to the furfural extraction units. The lower section of the "A" fractionator is enlarged and serves as a surge tank for dry furfural. This section is equipped with high and low liquid level alarms which operate a system of red and green lights on the control panel. At present, serious thought is being given to a two-way control arrangement which will return excess solvent to storage or bring in fresh makeup solvent to the system.

Earlier units have all had cast iron bubble decks in the recovery system towers, with the exception that aluminum trays were used in the pressure flash tower above the feed inlet where corrosion is at its maximum. The new unit is equipped with light weight sectional trays of all stainless steel construction which are expected to combat effectively the mild corrosion of the dilute organic acids in the system. They are arranged for ease of access for inspection and replacement with a minimum number of shell manholes. The stripping towers are necessarily of small diameter and special tray designs were developed to permit assembly and dismantling in the small vessels.

Vertical all-radiant type tube stills are used for both the extract and raffinate heating services. The use of split feed to dual coils in the extract heater permits low pressure drop across the tubes as well as low pressure operation in the vaporizer section. Thus maximum vaporization of the large volume of solvent in the heater charge is obtained at minimum temperature. This feature assumes relatively important aspects when considered in the light of less decomposition of the solvent and, hence, decreased formation of corrosive organic acid compounds. The charge is evenly split to the coils by means of manually set flow proportioning valves and manometric-type flow indicating meters.

The lesser equipment is of the conventional type. Motor and turbine driven centrifugal pumps are used in the operation at all points where suction conditions favor their use. They are all equipped with mechanical seals which are giving excellent performance in furfural service. The balance of the pumping equipment is of the reciprocating type. Heat exchangers, condensers, and coolers, except the final cooler for the extract product, are of the shell and tube type. All are mounted in the steel structure on decks floored with checkered plate which provides ample room for tube bundle removal and maintenance work.

Throughout the unit, extreme care is taken to reduce the loss of solvent to a minimum. Two separate drainage systems have been installed; one to handle the usual drainage of oil or water, and the other to accumulate drainage from those points where solvent may be included. The latter empties into the slop tank from which the material is gradually reworked in the recovery system.

From an esthetic point of view, little has been left undone. The interior of the control room is conveniently divided into two pump rooms, change room, a combined office and laboratory, and a central control room from which the furfural unit and the nearly completed vacuum unit are controlled. The walls are finished throughout in buff colored tile wainscotting and light green upper section and ceiling. Flooring is of finished red concrete. In the control room, the same scheme is followed except that the ceiling is of white acoustic blocks. An innovation is the use of a projecting lighting hood over the whole length of the control board which provides excellent lighting for all the instruments. The room itself is lighted by simple decorative indirect lighting fixtures.

The structural steel work is finished in black, and all uninsulated vessels

and piping are covered with aluminum paint. The insulation on large vessels is of the block type, with a covering of corrugated aluminum sheeting which gives a startling but pleasing appearance. Insulated lines are covered with block type preformed to fit, and wrapped with aluminum sheeting. The heater stacks are painted black and the insulated walls finished in aluminum paint. A concrete slab, 90 ft by 125 ft., has been provided in front of the process building and encompassing all equipment. Further improvements are supplied by a 6-in. layer of white stone throughout the process area. While more than usual consideration has been given to appearance, it is felt that the operating personnel will take more pride in the unit and be more conscious of good housekeeping.

When the expansion progress plans were completed, management decided that, since the present lubricating oil plant was producing a high grade motor oil, it would be advisable to construct this unit first. In this manner, the present finished lube stock, prior to percolation, could be "polished" to a higher viscosity index. Such a processing scheme would permit the production of the premium oils while other changes in lube processing were being made. Thus, present charge oil to the furfural unit is finished oil with exception of the neutrals. This differs from present processing in that the acid treating and clay contacting operations are omitted. In the future, as other projects are completed, it is probable that the new unit will occupy a more efficient position in the lube processing scheme.

Classes Conducted

A rather complete educational program was extended to the operating personnel prior to the start-up. All were given the opportunity to operate a continuous furfural pilot plant[2] on various types of stocks from which they obtained a sound knowledge of operating conditions, product quality, yields, etc. In addition, a number of discussion type class room periods were held in which start-up and shutdown procedures, operating technique and problems, lube oil specifications, etc., were presented by the management. The results of this program amply rewarded management in the efficient manner the operators have handled the new unit in its first 3 weeks of operation.

Flow through the unit is as follows: Solvent from the "A" fractionator is charged to the top of the treating tower through a cooler at required temperature. Charge oil after being preheated by exhaust steam exchanger and raised to operating temperature by controlled live steam exchanger enters the tower at one of three nozzles below the solvent inlet. As previously stated, intercooler streams control the temperature gradient. An extract recycle stream is also returned to the treating tower to obtain maximum yield of raffinate.

The raffinate mix (10-15 per cent solvent) leaves the treating tower at the top, picks up heat in an exchange with finished raffinate, and enters the raffinate heater. The outlet temperature is controlled to that necessary for flashing to the stripper. Steam is admitted to the bottom of the stripper and both solvent and steam are taken overhead to a condenser which also serves the extract stripper overhead. The condensed material drops into the CBM receiver. The condenser is located on top deck of the structure and has a small disengaging drum beneath it. A vacuum pump removes noncondensable material from the top of this drum, and a reduced pressure of 3-5 psia. is effected. The finished raffinate is removed from stripper bottom through the aforementioned exchanger and a cooler to storage.

The extract mix upon leaving the bottom of the treating tower is directed by tower pressure to an exchanger system which provides the necesary heat for the primary flash at atmospheric pressure. It cools the extract recycle returning to the treating tower, condenses the atmospheric column overhead vapor, condenses the pressure flash tower overhead vapor, and enters the atmospheric flash tower where approximately 40 per cent of the solvent is removed overhead. The dry vapor overhead after condensation in exchange condenser enters the "A" fractionator at its bubble point. The extract mix, now less rich in solvent, is pumped through the extract heater. At the outlet, the temperature is carefully controlled, and attention is given to prevent excess of 450° F. Above this condition, furfural begins to decompose, and for this reason previous mention has been made of the concentration of organic acid compounds at this point. The material flashes into the pressure vessel which operates under 30 psi. The overhead dry furfural vapor is condensed by exchange previously mentioned and enters "A" fractionator. A vapor slip stream is taken ahead of the condenser exchanger and direct to the "A" fractionator, the purpose of which will be explained in later paragraphs. The bottom product from the pressure flash vessel contains approximately 5 per cent solvent. Flow to low pressure stripper is level-controlled. A portion of this bottom product is returned by pump to the treating tower as extract recycle. The stripper is operated in the same manner as the raffinate stripper. The heat content of the bottom pressure flash product is sufficient to vaporize the remaining furfural, and steam is added to insure complete stripping. The overhead steam and solvent vapors are led to the common condenser. The stripped extract is pumped through a coil-in-box cooler.

Slip Stream Used

In the past, reflux to all recovery system towers was dry furfural. That portion which served the two strippers eventually reached the CBM tank and had to be processed for drying. The new unit, however, utilizes a slip stream from the "B" fractionator charge pump (approximately 93 per cent water). Due to the difference in latent heat contents of furfural and water, the volume required for reflux duty is reduced 75 per cent, and effectively reduces the volume of furfural to be dried.

It probably has been noted that the dry furfural streams in the recovery system are returned to the "A" fractionator, whereas the wet streams are accumulated in the CBM tank. Furfural and water form a constant boiling point mixture, containing approximately 35 per cent by weight of furfural, whose boiling point is lower than either of the components. Therefore, a somewhat elaborate method for water solvent separation is used. Due to solubilities of water in furfural and furfural in water, two well defined layers are received in the CBM receiver. Contingent on temperature, these layers vary in composition, but for average operating conditions (110° F.) the upper layer is composed of 8½ per cent by weight furfural in water and the lower mixture consists of 5½ per cent by weight water in furfural.

The bottom layer is charged to the top of the "A" fractionator. This column previously was described as serving two purposes; one, the enlarged bottom section serves as a solvent surge capacity; and two, the top section for stripping out the CBM content. The dry furfural from the pressure flash column enters the bottom storage section directly. The wet furfural from the CBM receiver enters on the top deck of the fractionating section. Four trays down from the top, the furfural is admitted from the atmospheric flash column which contains small amounts of moisture picked up from the oil charge. Between the two sections of the vessel is admitted the vapor slip stream from the pressure flash vapor line. As this vapor moves upward through the bubble decks, it exchanges heat with the CBM material which vaporizes and the furfural vapor is condensed. The overhead from the column is a CBM carrying furfural and all the water from the "A" fractionator. The overhead is condensed and led to the CBM receiver where it mixes with other streams and the same solubility equilibrium is set up.

The top layer of the CBM is charged to the "B" fractionator. Steam is admitted to the lower section of the vessel and serves the same purpose as does the furfural vapor in the "A" fractionator. The overhead is a CBM, and the bulk of the water in the charge drops to the bottom and

is removed continuously therefrom to the sewer. In the event that tower operation is upset leaving considerable solvent in the water, the effluent stream is directed to a slop tank from which it may be reprocessed through the unit.

During the first 3 weeks of operation, three types of charge oil were processed to provide a quick appraisal of the equipment. The unit came "on stream" for the first time with little difficulty and produced a relatively small volume of off-specification material for rerunning. On each stock, the charge rate was increased to 15 per cent above the design capacity which was insufficient to determine the limiting throughput factor. During the changeover from one stock to another, operating conditions were so maintained to continue producing a 95 V.I. intermediate oil which was run down to a special tank. When the raffinate from the new charge oil met the new specifications, it was switched to regular rundown tanks from which it would be processed through the percolation filters. The material in the special tank was inspected thoroughly and will be used for blending purposes. At present, management has not revealed its intended disposition of the extracts. It may be stated, however, that little of it will find its way into the fuel oil market.

Treating conditions and laboratory analyses as obtained from processing neutral and bright stocks are presented in Tables 1 and 2. The neutral charge oil is produced by chilling and pressing of a light wax distillate and reducing the pressed oil to sufficient viscosity to allow for loss in the furfural unit. Pretreatment of the bright stock consists of chilling a naphtha blend of residual stock and acid treating at temperatures well below 0° F. In this process, dewaxing and deasphalting occurs simultaneously. The acid treated oil solution is clay contacted, filtered, and reduced to a predetermined viscosity.

Specification values on all oils, both solvent treated and regular grades, will be revised upward in quality as new projects are completed. The new vacuum distillation unit, which replaces an out-moded atmospheric unit for production of raw lube fractions from crude oil will be completed in late July. Additions and revision to present refrigeration and pressing equipment which will permit production of low pour point oils at proposed higher capacity will be ready in the next few weeks. Other lube equipment included in the construction program are a lube distillation unit and serious consideration of newer type dewaxing processes.

Operating cost data from the present run is far too meager and not sufficiently accurate to justify inclusion in the foregoing. However, an accurate figure for solvent loss has been determined. Based on solvent storage gages before and after the 3-weeks run and allowing for that volume in the off-specification tank, which will be rerun, the daily loss averages 42 gal. This represents 0.06 per cent daily loss based on hourly circulation rate of the solvent. It is expected that this value will be decreased as operation progresses, even though it is unusually low for start-up operation.

References

1. Brown, L. C., Converted U.O.P. Isomerization Unit Now Makes Polymer Gasoline, The Oil and Gas Journal, May 17, 1947, p. 91.

2. Brown, L. C., Pilot Plant Aids Operation of Furfural Extraction Unit, The Oil and Gas Journal, June 14, 1947, p. 112.

BOOKS

REPORT ON STANDARD SAMPLES FOR SPECTROCHEMICAL ANALYSIS—1947. Compiled by A.S.T.M. Committee E-2, Subcommittee IV on Standards and Pure Materials. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 23 pp. $1.25.

This comprehensive report extends and replaces information given in an earlier publication issued in 1944. There have been many changes in the supply of standard materials and many new ones have been made available. Following an introduction describing the scope of the report there are listed in the form of extensive tables and tests available standard samples on: iron and steel; aluminum and its alloys; magnesium and its alloys; zinc, lead, and tin alloys, and copper alloys, as well as several miscellaneous materials.

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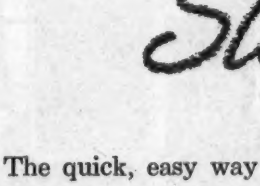

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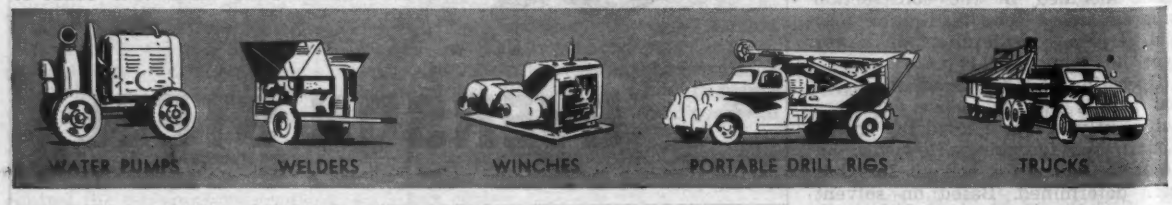

MODERN Rotary DRILLING

Construction Methods of Wire Rope in Process of Evolution

A WIRE line should be considered as a machine composed of a large number of small parts in close contact with each other. For instance, in a 6 x 19 wire rope there are 114 wires which, with the core, represent 115 working parts. Subjected to axial loading, internal and external stresses, heavy surface pressures and abrasion, all under conditions of high speeds, these parts are in continuous motion in relation to each other. The motion is a result of both lengthening of the rope under application of loads and of changes which occur within the rope as it enters, passes over, and leaves the grooves of the sheaves. The resulting internal friction of the rope is highly destructive to the rope, and proper lubrication is one of the most important factors affecting the useful life of the rope.

In the manufacturing process, the core of the rope and the whole rope itself are thoroughly lubricated. Extensive research in the field of wire-line lubricants has been conducted for years, and is being continued. The goal is to obtain a lubricant, or rather a series of lubricants, which will perform all different actions needed for protection of the rope. For instance, one series of products now used is compounded to supply to the adjacent strands a soft lubricant. This is held in the rope by an exterior sheath of lubricant that does not "throw off" of the line at high speeds and normal temperatures, and does not flake off at low temperatures. This combination maintains satisfactory rope lubrication and seals out moisture, dust, and abrasive and corrosive matter. Rust inhibitor also is included to protect the line in shipment and field storage.

Initial lubrication does not last the life of the rope. Compressive forces to which the rope is subjected and the movements of the rope parts in relation to each other tend to squeeze the lubricants out of the rope. This lubricant then may be thrown off by centrifugal force as the rope passes over the sheave at high speed or it may drip off. Importance of field lubrication of the rope is generally recognized and many operators have developed their own methods of application of the lubricant while the rope is in service.

Selection of the proper type of lubricant to be used is important and is governed by several factors. One of them is the atmospheric conditions of the area in which the drilling line is used. Requirements for the lubricant are different in arid areas, where winds carry minute particles of abrasive matter, from those for regions of high humidity. Another factor is the type of construction used. In general, wire lubricants must have ability to penetrate, to adhere, and to lubricate and preserve. They must be free from ingredients harmful to steel or to the core.

Present Demands

In this and the preceding installment, factors were summarized which have effect on the useful life of wire ropes. Modern drilling, characterized by increased depths and trend toward increased efficiency of operations, puts additional emphasis on the effect of these factors. Loads and speeds are increased. Time needed for making of the round trip with drill pipe is lengthened and, under conditions encountered in certain areas of deep drilling, the frequency of round trips is increased. Since the principal work of the wire rope is performed during the hoisting and lowering of the pipe, the rope is subjected to wear over extended periods of time.

Noted also should be the trend toward preformed lines and toward use of longer-length lines. From the point of view of manufacturers, emphasis is placed on metallurgical research to improve the physical characteristics of the rope, on new wire-drawing equipment, and on research in the field of lubrication and improvement of fiber centers.

Wire-Line Study

While this gradual evolution is taking place, investigations now conducted may lead toward more radical changes in the future. An industry-wide study is now being made by the American Petroleum Institute committee on wire rope and manila cordage, in cooperation with wire-rope manufacturers, of the requirements imposed on the wire rope by present and possible future deep drilling. While this investigation is still in progress and while no conclusions have been reached, the scope of the study may be of interest.

One phase of the study deals with collection and analysis of data on performance of standard and some experimental ropes under present deep-drilling conditions. This investigation includes: (1) sheaves, grooves, drums, and rope diameters; (2) economical lengths of rope and best procedure for cutting off the line to distribute the wear, and (3) proper number of lines for different drilling conditions, etc.

The other part of the study deals with future requirements which may be put on drilling lines. This phase of investigation is of necessity closely related to similar studies of other types of drilling equipment. On one side, the size of the rope to be used in the future determines the needed characteristics of certain other elements of the rig, such as, for instance, derricks (Installment No. 8). On the other side, types of equipment to be used would have important bearing on the needed characteristics of wire lines.

Two factors in the above require particular consideration. One is the expected depth to which wells will have to be drilled. Second is the planned size of the hole to be drilled, which determines the probable casing program and expected sizes and weights of drill pipe. These two factors will determine the loads which will have to be handled in the future by rotary drilling lines.

No. 28 in a series by Joseph Zaba, petroleum engineer, Houston

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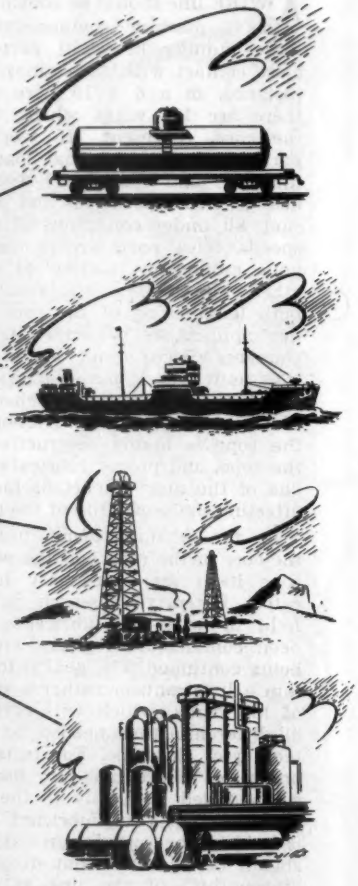

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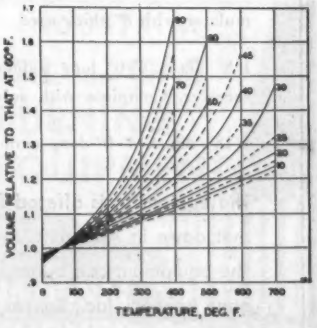
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Volume of Liquid at High Temperatures

Factors by which the volume at 60° F. should be multiplied to obtain volume at the high temperature

Temp. (°F.)	A.P.I. (SPECIFIC GRAVITY) AT 60° F.															
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
	1.0366	1.000	0.9659	0.9340	0.9042	0.8763	0.8493	0.8251	0.8017	0.7796	0.7587	0.7389	0.7201	0.7022	0.6852	0.6690
0	0.9820	.982	.981	.980	.979	.978	.977	.976	.974	.973	.971	.968	.966	.964	.962	.956
20	0.9880	.988	.987	.987	.986	.986	.985	.984	.983	.982	.981	.979	.978	.976	.975	.970
40	0.994	.994	.994	.994	.993	.993	.993	.992	.992	.991	.990	.990	.989	.988	.988	.985
60	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
80	1.005	1.006	1.007	1.007	1.008	1.009	1.009	1.010	1.010	1.011	1.012	1.013	1.014	1.015	1.016	1.019
100	1.010	1.012	1.014	1.015	1.016	1.017	1.018	1.019	1.020	1.022	1.024	1.026	1.028	1.031	1.033	1.038
120	1.016	1.019	1.021	1.022	1.023	1.026	1.028	1.029	1.031	1.032	1.037	1.038	1.044	1.046	1.051	1.059
140	1.022	1.025	1.027	1.029	1.031	1.035	1.038	1.039	1.042	1.044	1.049	1.051	1.057	1.062	1.068	1.075
160	1.028	1.032	1.034	1.036	1.039	1.044	1.048	1.049	1.053	1.056	1.062	1.066	1.073	1.080	1.089	1.098
180	1.034	1.039	1.040	1.043	1.047	1.053	1.058	1.059	1.064	1.070	1.076	1.082	1.090	1.100	1.110	1.120
200	1.040	1.045	1.047	1.050	1.055	1.062	1.068	1.069	1.076	1.083	1.089	1.097	1.107	1.118	1.130	1.145
220	1.046	1.052	1.054	1.058	1.063	1.072	1.079	1.082	1.090	1.099	1.105	1.115	1.125	1.139	1.151	1.172
240	1.053	1.060	1.062	1.066	1.072	1.082	1.090	1.095	1.105	1.114	1.124	1.134	1.145	1.161	1.179	1.202
260	1.059	1.067	1.070	1.073	1.080	1.092	1.101	1.109	1.120	1.131	1.142	1.154	1.168	1.190	1.213	1.239
280	1.066	1.074	1.077	1.081	1.089	1.102	1.112	1.122	1.135	1.148	1.160	1.175	1.192	1.218	1.245	1.277
300	1.072	1.079	1.085	1.089	1.098	1.112	1.123	1.135	1.150	1.165	1.182	1.200	1.220	1.250	1.282	1.325
320	1.079	1.087	1.092	1.097	1.107	1.122	1.135	1.149	1.165	1.182	1.202	1.222	1.250	1.285	1.327	1.372
340	1.087	1.095	1.100	1.106	1.116	1.132	1.147	1.163	1.184	1.201	1.225	1.250	1.283	1.330	1.375	1.435
360	1.094	1.103	1.107	1.115	1.125	1.142	1.160	1.177	1.201	1.223	1.252	1.279	1.322	1.375	1.434	1.500
380	1.102	1.109	1.115	1.124	1.134	1.152	1.172	1.191	1.220	1.245	1.278	1.313	1.360	1.423	1.495	1.575
400	1.110	1.115	1.122	1.133	1.143	1.163	1.185	1.205	1.240	1.272	1.310	1.355	1.408	1.480	1.567	1.670
420	1.118	1.126	1.130	1.141	1.152	1.173	1.199	1.221	1.259	1.298	1.342	1.390	....	....	....	....
440	1.127	1.184	1.139	1.150	1.161	1.184	1.213	1.239	1.278	1.325	1.375	1.435	....	....	....	....
460	1.135	1.140	1.147	1.158	1.171	1.194	1.227	1.258	1.300	1.356	1.414	1.485	....	....	....	....
480	1.143	1.148	1.156	1.167	1.180	1.205	1.241	1.286	1.328	1.388	1.457	1.544	....	....	....	....
500	1.146	1.155	1.165	1.176	1.190	1.216	1.255	1.298	1.360	1.420	1.500	1.600	....	....	....	....
520	1.158	1.163	1.174	1.185	1.202	1.230	1.272	1.323	1.392	....	....	....	....	....	....	....
540	1.165	1.172	1.183	1.195	1.214	1.244	1.289	1.350	1.427	....	....	....	....	....	....	....
560	1.171	1.180	1.192	1.205	1.227	1.260	1.310	1.389	1.468	....	....	....	....	....	....	....
580	1.178	1.188	1.201	1.215	1.239	1.278	1.335	1.415	1.515	....	....	....	....	....	....	....
600	1.185	1.195	1.210	1.225	1.252	1.300	1.365	1.455	1.570	....	....	....	....	....	....	....
620	1.192	1.203	1.218	1.235	1.266	1.325	....	....	....	....	....	....	....	....	....	....
640	1.200	1.211	1.227	1.245	1.280	1.354	....	....	....	....	....	....	....	....	....	....
660	1.208	1.219	1.235	1.255	1.294	1.387	....	....	....	....	....	....	....	....	....	....
680	1.215	1.228	1.243	1.265	1.308	1.427	....	....	....	....	....	....	....	....	....	....
700	1.223	1.235	1.252	1.275	1.323	1.475	....	....	....	....	....	....	....	....	....	....



No. 152 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

Equipment for Sale
Allegany Refiners, Inc.
Bolivar, N. Y.

1 Gasoline rerun unit for production of special naphthas, capacity 300 barrels per day charge, including 30 plate fractionating tower, reboilers, heat exchangers, condensers, pumps, instruments and piping.

2 Carbondale, 12 pipe wax distillate chilling machines, 36' long, 6" and 8" Carbondale double pipe style, 2 rows wide and 6 rows high, complete with chain and motor drive.

4 Carbondale hydraulic wax filter presses, 48" dia. x 45' 0" long equipped with 24" dia. x 8' 0" stroke ram, cast steel heads, 8—3" x 26' 0" steel tie rods. Cast iron frame, 250—48" dia. plates equipped with all new blankets and rings. 12" x 12" G.I. drip pan 16" dia. soft wax screw conveyor. Three of these presses installed, one not installed. Complete with motor drive.

1 Carbondale wax barreling machine 36" dia. x 5' 0" long, water cooled steel scraper with 2-way steel discharge chute C.I. frame, 30" x 38 tooth C.I. sprocket, belt driven to 10 HP 3/60/220 Induction motor and starter.

2 12" x 6" x 12" Carbondale steam horizontal Simplex ammonia pumps.

1 7' dia. x 7' high brine tank, insulated with 4" of cork.

1 36" dia. x 15' 0" long Carbondale horizontal brine cooler. Multipas tubular type 1132 sq. ft. cooling surface insulated with 8" thick cord board lagging.

1 26" dia. x 15" 0' long welded steel Carbondale ammonia condenser, spiral flow type 500 sq. ft.

1 18" dia. x 5' 0" long welded steel ammonia accumulator with 8" thick cord.

1 8" dia. x 6' 0" long welded anhydrous ammonia liquid receiver. Complete with safety valves.

1 18" dia. x 4' 0" long ammonia liquid cooler 35 sq. ft.

1 18" dia. x 12' long anhydrous ammonia receiver with relief valve.

1 Buffalo horizontal duplex steam fire pump size 16" x 9" x 12" bronze fitted. 750 GPM.

2 Worthington horizontal duplex pumps size 12" x 8½" x 12" suitable for fire pumps.

1 Pipe still furnace Leader Industries, Inc., Decatur, Ill., design, capacity 1000 B.P.D. steel framework and steel case backed with rock wool insulation and substantial fire brick lining equipped with 88—1¼" Timken Sicromo tubes in radiant section, 108 2" I.D. Timken Sicromo tubes convection section all fitted with Key 7000 series removable plug type headers.

1 Fractionating tower Leader Industries, Inc., Decatur, Ill., design, 4' 6" dia. 110' 6" high, 40 fractionating trays equipped with pressed steel bubble caps in lower sections, cast iron bubble caps in upper section. Equipped with full length spiral stairway, 10" vapor line 2½" reflux line, insulated with rock wool, wire and JM cement lagging.

1 Fractionating tower Alco Products Co. design. 5' 0" dia. x 93' 6" high 42 fractionating trays equipped with Alco pressed steel bubble caps. Ladder full length with platform each manway. 8" vapor line and 2" reflux line, tower insulated, rock wool and insulating cement with Thermocoat cover.

1 cooler box 13' 3" x 14' 0" x 61' 6" high, 2 compartment open top fabricated 5/16" steel plates, 3" x 3" x 5/16" top angle, channel iron buckstays, box contains 30 runs 3" cast iron pipe 10' long, cast iron return bends, 24 runs 3" steel pipe 10' long supported by 6" x 6" timbers.

1 Condenser box 10' 0" x 40' 0" x 8' 0" high. Contains 5 coils. 10 runs each cast iron simplex pipe, 32' long. Cast iron simplex return bends, 6" cast iron headers. 1 coil containing 15 runs 2" simplex cast iron pipe 5' long with Simplex cast iron return bends. All coils supported on 6" x 6" timbers.

The equipment is offered for immediate sale, where is and as is. Purchaser to remove equipment. This refinery shut down in April 1947 and all of the equipment is in excellent condition and properly prepared for removal. The equipment can be inspected at the refinery site by contacting Mr. A. K. Wickham, Refinery Manager, Allegany Refiners, Inc., Bolivar, N. Y.

REFINING

Bright Future Seen for Petrochemical Industry

THE rapidly expanding chemical industry has turned to petroleum as a major source of raw materials, but the petroleum industry recognizes that its primary obligation is that of producing and distributing energy in the form of liquid fuel, according to Dr. H. G. Burks, general manager of East Coast manufacturing operations for Standard Oil Co. of New Jersey.

Development of many improved refining techniques has made available large volumes of potential raw materials for the manufacture of chemicals, plastics, explosives, and synthetic rubber, he said, predicting that petroleum will play an increasingly important role as a supplier of chemicals. Burks' remarks were made in a report to the North Jersey section of the American Chemical Society.

Recently published information indicates that synthetic fuels made from natural gas can compete economically with petroleum fuels, and synthetic gasoline plants promise to be another rich source of organic chemicals, he added.

"In view of the potentially abundant supply of raw materials from petroleum and natural gas, the production of chemicals from these sources in the future appears bright."

Enough rubber to meet the needs of the entire world could be made from 0.5 per cent of the world's petroleum production, he declared, and less than 1 per cent of the current world oil output, estimated at 8,000,000 bbl. a day, would take care of world alcohol requirements. Despite the wide range of chemicals and synthetic products now manufactured from petroleum, he said, only a fraction of 1 per cent of the total production is utilized for these purposes.

Bay Installing Unit

Bay Petroleum Corp. is installing a new reforming unit in its Denver refinery at a cost of about $200,000.

This portable 10-ton stores trailer was designed by the storekeeper at Shell Oil Co.'s Wood River, Ill., refinery to speed work and cut costs on routine maintenance shutdowns. The trailer carries a generous stock of commonly used material and is driven to the site of a shutdown to save the time men spend in going back and forth between the job and the central stores. In one trial period of 6 weeks, the trailer served four shutdowns totaling 20 working days. In that time it filled nearly 1,100 orders that accounted for 92 per cent of all material used on the jobs. Based on this record, company officials estimate that the trailer will pay for itself within 3 months. The trailer has its own heating, ventilating, and electrical systems and telephone

The company last month purchased for $46,000 a gas-concentration plant and two high-pressure storage tanks built by the Government at the Bay refinery during the war.

Eastern States Buys U. S. Plant for $2,000,000

WASHINGTON.—War Assets Administration has approved sale of a surplus 100-octane gasoline refinery at Houston, exclusive of personal property and royalty rights, to Eastern States Petroleum Co., Inc., for $2,000,000. Original cost of the refinery to the Government was $10,351,000.

Sale terms provide that no cash down payment will be required providing the company expends not less than $400,000 on capital improvements during the first 2 years. Any difference between that amount and the sums actually thus expended are to be paid to the Government.

The entire purchase price is to be paid at the rate of $20,100 per month for the first 2 years and $30,000 per month thereafter, including interest at 4 per cent per year on unpaid balances. In addition, the company is to pay $109,213 representing credit on paid-up royalties for catalytic cracking if and when the company benefits from this credit. Payments are to be made quarterly. The company is granted the right to buy equipment at the plant within 6 months, at prices to be determined by WAA.

The Government plant adjoins Eastern States 30,000-bbl. daily capacity refinery in Houston. R. B. Khale, president of the company, said considerable more than $400,000 will be expended in modernizing the property and installing equipment for the manufacture of products used in the chemical industry.

Champlin Aids College Fund

Champlin Refining Co., Enid, Okla., has sent an $8,000 check to Phillips University, Enid, to aid in rebuilding

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the university's administration building, destroyed recently by fire. The check brought the fund to $79,062. Goal is $100,000.

Chemists Institute Favors National Science Foundation

NEW YORK.—The American Institute of Chemists favors the establishment of a national science foundation as a medium through which basic scientific research could be supported by the federal Government, Dr. Foster D. Snell, institute president, said here recently.

The statement was made on the occasion of the acceptance by the institute of the report of its committee on national legislation affecting chemists.

The amazing results of concentration of a large number of scientists on the atomic problem is a precedent upon which to base expectations for the future, if and when Government's full power is applied to scientific problems, the report outlined. Research should be carried on where it can be conducted in the best manner, and scientific specialists of the foundation are best able to judge proper location for any research problem. The committee disapproved of apportionment of funds by geographical and population criteria, as well as expenditures only in tax-supported institutions, and favored freedom from special interests and political pressure in the foundation's administration.

W.P.R.A. to Hear Paper On Small Cracking Unit

Discussion and demonstration of the operation of a small-scale catalytic-cracking unit will highlight a regional technical meeting of the Western Petroleum Refiners Association at the Leonard Refineries, Inc., refinery in Alma, Mich., July 16. The unit there was placed on stream in March.

A paper on the operation of this unit will be presented by John S. Pfarr, technical director and manager of manufacturing for Leonard, to be followed by an inspection tour of the plant. Also to be presented is a paper on the manufacture of liquefied petroleum gas by the small refiner by H. E. Chambers, Skelly Oil Co., El Dorado, Kans.

Industrial-relations meetings of the W.P.R.A. have been scheduled for July 11 in the Broadview Hotel, Wichita, Kans.; Olds Hotel, Lansing, Mich., July 17 following the Alma meeting; and the Blackstone Hotel, Fort Worth, July 25. Purpose of these meetings is to acquaint the industry with the contents of the new Taft-Hartley law and discuss probable changes and implications in contract negotiations under the law.

Output of Bright Stocks Shows Increase in May

Production of bright stocks and viscous neutrals by Mid-Continent refiners showed increases during May, according to the monthly lubricating-oil report of the Western Refiners Association.

Production of bright stocks by 13 participating refiners in the Midwestern area during May averaged 9,129 bbl. daily, an increase of 658 bbl. daily over the April average of 8,471 bbl. daily. Viscous neutrals output increased from 16,571 bbl. daily in April to 17,258 bbl. daily in May, a daily average increase of 687 bbl.

Output of blended oils dropped from a daily average of 19,284 bbl. in April to 17,689 bbl. in May, while production of paraffin oils dropped from a daily average of 3,704 bbl. daily to 2,518 bbl. daily. Production of steam refined stock showed an increase from 837 bbl. daily in April to 1,186 bbl. daily in May.

Socony Contract Let

Socony-Vacuum Oil Co. has awarded additional contracts for construction work in its East Chicago (Ind.) refinery to Catalytic Construction Co. The work includes a sewer system, alloy line to an existing tower, and maintenance activities.

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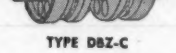
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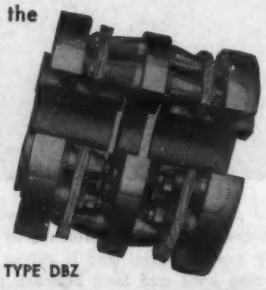
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PIPE LINES

Texas Eastern Plans 21 Compressor Stations

WASHINGTON. — Texas Eastern Transmission Corp. has requested Federal Power Commission approval of plans to install 17 compressor stations in addition to the four for which temporary FPC authorization has already been granted.

Texas Eastern's request was made in an amendment to its application for authority to operate the Big and Little Big Inch lines which it is in the process of purchasing from the Government. The amendment also outlined plans to construct laterals to deliver natural gas to Philadelphia Gas Works Co. and Philadelphia Electric Co.

The 17 proposed compressor stations would have an aggregate of 125,000 hp. The four stations proposed earlier would have 28,000 hp.

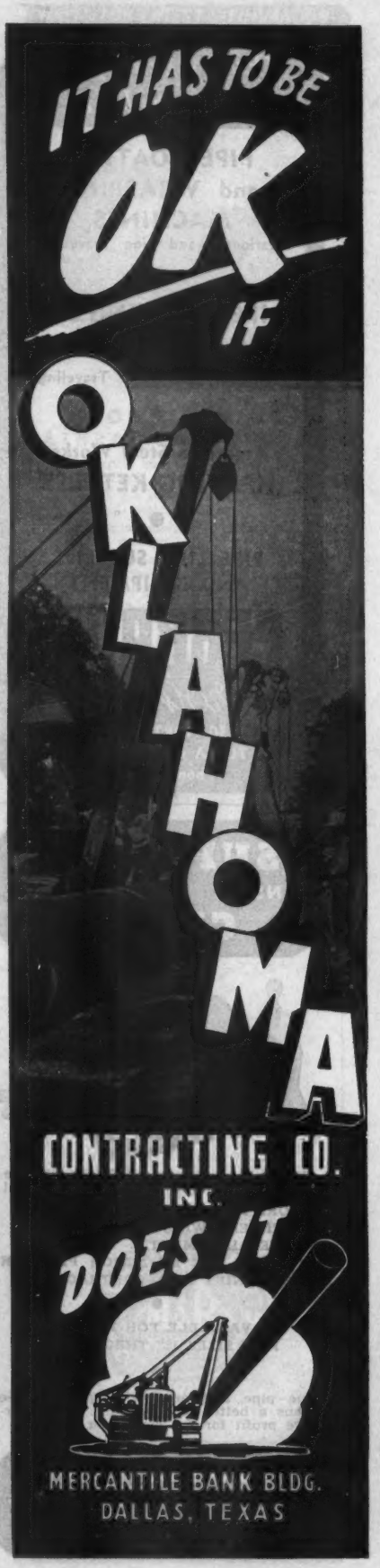
Texas Eastern's amendment limited its initial operations to transmission of natural gas to the Appalachian and Philadelphia areas and stated that it proposed to make use of its system east of the Philadelphia laterals primarily for storage purposes in order to meet better the demands of its buyers on days of peak demands. The application filed previously asked authorization to construct 66 miles of lateral lines to connect the Inch lines with various gas-distributing systems in the Philadelphia and New Jersey areas. Lateral lines requested in the amended application totaled 31 miles.

The proposal to construct a total of 21 compressor stations aggregating 153,000 hp. was offered as a substitute for the previous plan of constructing 27 compressor stations with an aggregate of 140,000 hp. The company stated that it had determined that approximately 433,000,000 cu. ft. sales capacity instead of the 425,000,000 cu. ft. originally contemplated will result in the most desirable operating conditions and to accomplish this it would be necessary to construct the 21 compressor stations with a total of 153,000 hp.

Hearing on Texas Eastern's application was scheduled to open this week.

The commission has granted permission to intervene in the proceedings to: Anthracite Institute, Eastern Railroads, Central Illinois Public Service Co., Central Indiana Gas Co., Chesapeake & Ohio Railroad, Eastern Gas & Fuel Associates, Illinois Power Co., Indiana Gas & Water Co., Inc., Kentucky Natural Gas Corp., Kokomo Gas & Fuel Co., Missouri Power & Light Co., Missouri Utilities Co., National Coal Association, United

This photograph graphically illustrates difficulties encountered in clearing some of the right-of-way for the Socony-Vacuum Oil Co., Inc., pipe line from the Paulsboro, N. J., refinery to Midland, Pa. The now-completed 350-mile line forms an important addition to the company's product-distribution system. (For other details on the line, see The Oil and Gas Journal, May 24, page 128)



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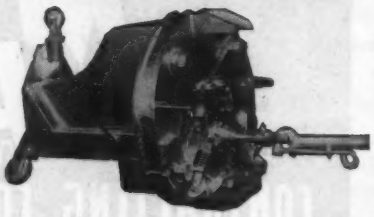

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Mine Workers, Northern Indiana Public Service Co., Order of Railway Conductors, Brotherhood of Locomotive Engineers, Brotherhood of Locomotive Firemen and Enginemen, Switchmen's Union of America, City of Toledo, Ohio, Eastern States Retail Solid Fuel Conference, East Ohio Gas Co., Peoples Natural Gas Co., New York State Natural Gas Corp., the City of Indianapolis, Ind., and Koppers Co., Inc. The following state regulatory commissions have also intervened: Arkansas, Illinois, Michigan, Pennsylvania, Ohio, Indiana, Missouri, and West Virginia.

Pennsylvania Extension Of Big Inch Is Planned

Plans have been announced for construction by United Natural Gas Co. of a 75-mile, 20-in. line connecting with the Big Inch and extending through parts of Beaver, Allegheny, Washington, and Green counties in Pennsylvania.

The project is estimated to cost about $3,750,000. Another $1,250,000 is to be expended for construction of a new compressor station at Ellwood City, Pa., and for changes in existing compressor stations.

T. G. & T. Prepares for Large Looping Program

Tennessee Gas & Transmission Co. plans to complete its 912-mile looping program using 20 to 26-in. pipe.

Contracts have already been let to Latex Construction Co. for 120 miles of 26-in. in northern Mississippi and southwestern Tennessee. Morrison Brothers have a contract for 90 miles in Tennessee and Kentucky. Anderson Brothers Co. will lay 80 miles in eastern Kentucky. J. R. Horrigan Construction Co. will lay approximately 70 miles in the Monroe, La., area.

The centrifugal compressor to be installed in the vicinity of Moorhead, Ky., will be driven by a 2,000-hp. motor; the compressor will handle 3,000,000 cu. ft. daily. It is expected that the initial installation work will start this summer and that the station will be in full operation in December.

Texas Pipe Line to Start Products Line in August

Texas Pipe Line Co. expects to start construction of its 172-mile, 10-in. Hearne - Fort Worth and Dallas products line late in August. Contract was let to Associated Engineers and Contractors.

In addition to the Hearne - Fort Worth and Dallas line, the Texas Pipe Line Co. is preparing to play a 6-in. line from Hearne to San Marcus to connect with a 6-in. line which has been in crude-oil service. This will be converted to running refined products from San Marcus to San Antonio. The contract for the Hearne-San Marcus line will not be let for 60 days.

Specifications will be issued in about 60 days for 500-mile crude line to be laid by a joint undertaking of Texas Pipe Line Co., Shell Pipe Line Corp., and Empire Pipeline Co. which will have 20, 22, and 24-in. pipe extending from Jal, N. M., to Cushing, Okla. It is predicted that construction will be divided in six sections. Survey work is still in progress. Construction is expected to get under way in September.

Interstate Expanding Pipe Line System

Interstate Oil Pipe Line Co. has completed 17½ miles of 10½-in. pipe line between Cranfield and Liberty, Miss. This is a loop on the original 34-mile, 8-in. line. The job was contracted by Associated Engineers & Contractors.

A contract has been let to Townsend & Montily by the company for a 12½-mile, 4-in. line from Bayou Mallet, La., east of Baton Rouge, to the Sunset Roanoke line.

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MORRISON BROS. CONSTRUCTION CO. INC.

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ing to let a contract for 8½ miles of 6 and 7-in. line to serve Spirit Lake and Miller fields of Arkansas. This will connect with the company's main Glenn Pool, Okla., to Baton Rouge trunk line near the Mandeville station in southwest Arkansas.

Two new 480-hp. diesel engines driving reciprocating pumps are being installed at the company's Liberty station to double its capacity.

At Cranfield, Miss., two 450-hp. units are being installed to replace portable units. Each unit has a 30,000-bbl. daily capacity. The Cranfield construction has started for a 30,000-bbl. floating-roof tank.

At Lake St. John, a station is under construction which will have three 375-hp. diesels, each having a capacity of 15,000 bbl. daily. Preparations are being made to connect with the California Co.'s cycling plant at Lake St. John some time in August. Installation work at all of the stations mentioned has been contracted by Refinery Maintenance Co.

First Section Completed on New Venezuelan Line

Crude oil for refineries in the United States was to start flowing last week through the first section of a new pipe line built by Socony-Vacuum Co., Inc., from its Guico field in Eastern Venezuela.

The first section extends 40 miles from Guico field to the line's main camp, tank farm, and pumping station at Anaco. When entirely completed, the new line will extend 103 miles from West Guico to a tanker-loading terminal on the Caribbean Sea at Guanta. Final completion of the entire line is scheduled for about August 1, depending on arrivals of pipe and other materials.

Until the remainder of the 103-mile pipe line is completed, the crude oil will be relayed at Anaco to the tanker-loading terminal by other existing lines, according to a company announcement.

Socony-Vacuum representatives said the new Guico-Guanta line will be on the surface for its entire length with exception of several places where it crosses streams or goes through small towns. It will be 12 in. throughout, with a capacity of 70,000 bbl. per day and an operating pressure of 825 psi. A telephone circuit will parallel the line.

In addition to Guico and Guario fields, Socony-Vacuum holds concessions from the Venezuelan Government on more than 600,000 acres of land which, if oil is found on it, will be served also by the new pipe line. Socony-Vacuum representatives added that a large portion of the new line's deliveries will be utilized at the company's Paulsboro, N. J., and other East Coast refineries.

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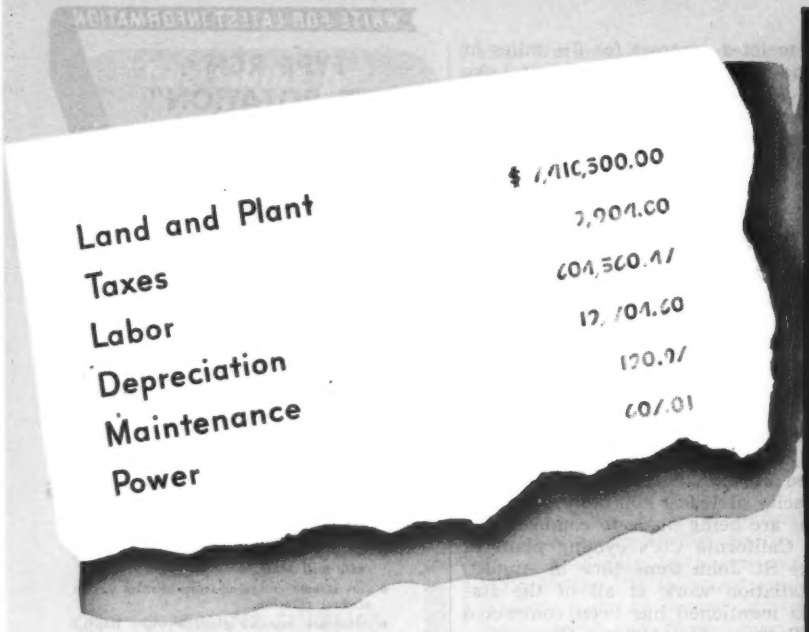

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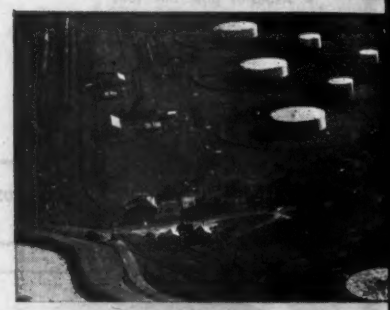

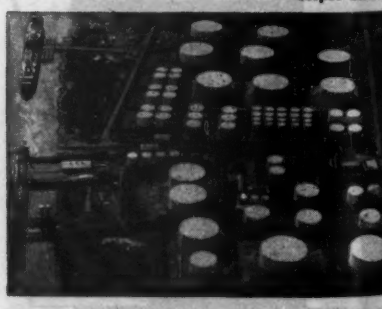

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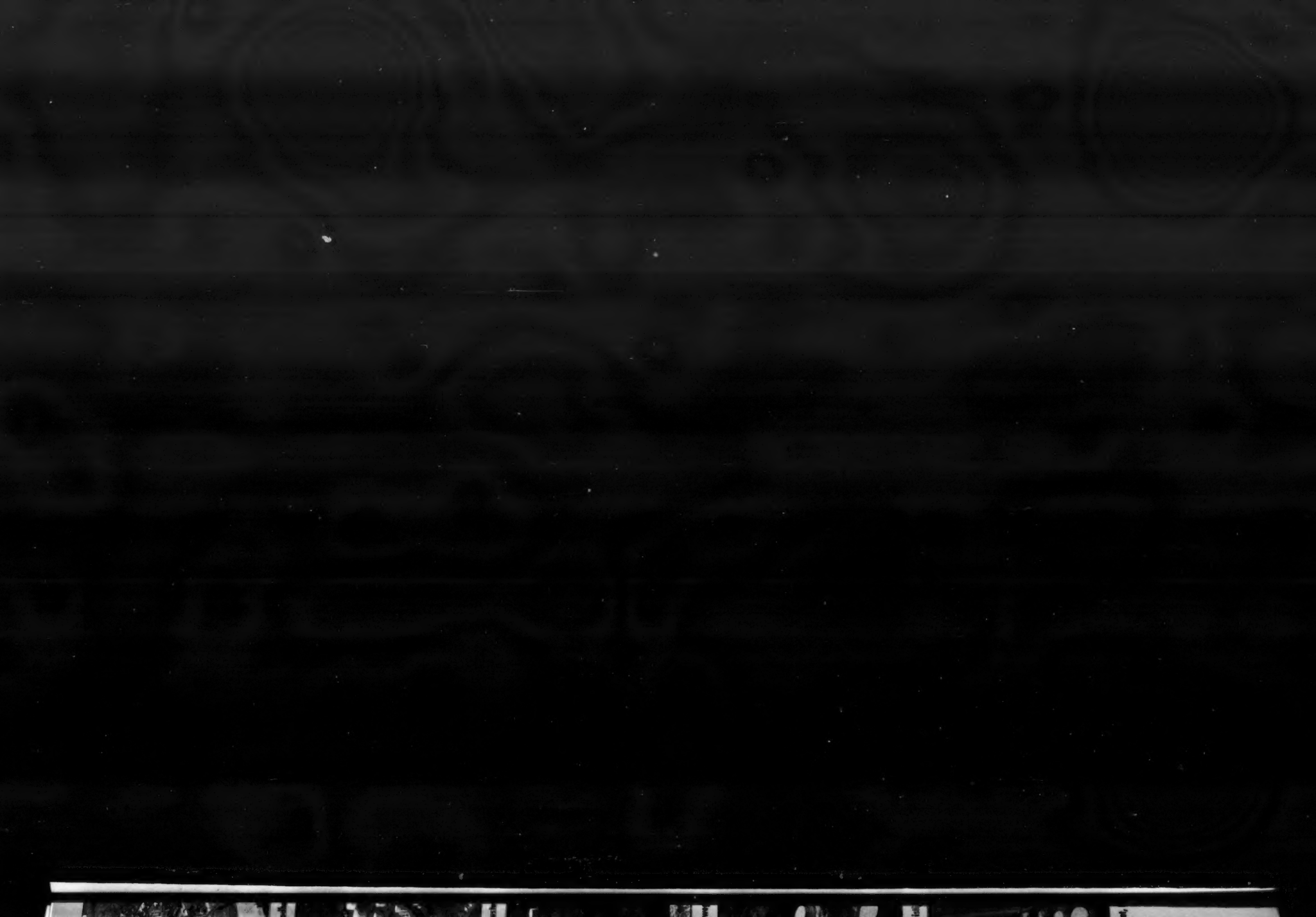


NATURAL GAS

Reed Nominated for A. G. A. Presidency

HUDSON W. REED, president, Philadelphia Gas Works Co., Philadelphia, has been nominated for the presidency of the American Gas Association to succeed R. H. Hargrove, vice president and general manager of Texas Eastern Transmission Corp.

Hudson's selection by the general nominating committee is subject to election at the twenty-ninth annual convention of the association October 6-8 in Cleveland. Hudson's name topped the list of the selections of general and sectional nominating committees for the 1947-48 association year.

Other nominations include Robert W. Hendee, president, Colorado Interstate Gas Co., Colorado Springs, for first vice president; Hugh H. Cuthrell, vice president, Brooklyn Union Gas Co., for second vice president; and Edward F. Barrett, president, Long Island Lighting Co., for reelection as treasurer.

Slated for new directors for a 2-year term are: Walter C. Beckjord, Cincinnati; Edward G. Boyer, Philadelphia; Henry R. Cook, Baltimore; Earl H. Eacker, Boston; Joseph N. Greene, Birmingham; D. A. Hulcy, Dallas; F. A. Lydecker, Newark; James S. Moulton, San Francisco; Edward P. Noppel, New York; John A. Robertshaw, Youngwood; W. H. Rudolph, Newark; Louis B. Schiesz, Indianapolis; Edward J. Tucker, Toronto; Harry K. Wrench, Minneapolis; and C. H. Zachry, Dallas.

The committee in charge of general arrangements and programs for the general sessions of the Cleveland convention met last week at the A.G.A. headquarters in New York. The group, headed by J. French Robinson, president, East Ohio Gas Co., said large attendance anticipated at the meeting indicates that "housing difficulties commonly experienced today may be expected." It urged that reservations for the convention be made through E. C. Brennan, A.G.A. housing secretary, 511 Terminal Tower, Cleveland 13, Ohio.

Gas Utilities Advised To Use Substitute Fuels

Manufactured and mixed-gas utility companies have been advised to use substitute fuels wherever possible and to utilize every known method of stretching present limited stocks of solid fuels.

The American Gas Association said it is not expected that any gas utility company will have to suspend operations completely unless there is a prolonged coal strike. Stocks of coal and coal on hand and in transit on June 15 were sufficient for about 35 days of normal operation, the A.G.A. report said.

Kansan to Distribute Cities Service Refunds

James E. Smith, Topeka, Kans., attorney, has been appointed special master by the U. S. Circuit Court of Appeals to conduct the distribution of $24,000,000 in refunds of Cities Service Gas Co. to consumers in Kansas, Missouri, Nebraska, and Oklahoma.

Interest on the impounded funds, invested in Government bonds, which now totals about $20,000, will be used to administer the distribution.

Continued Increase Shown In Sales of Natural Gas

Sales of natural gas during May totaled 1,998,796,000 therms, an increase of 13.4 per cent compared with the same month a year ago.

The American Gas Association said the index of natural-gas sales on May 31 stood at 208.6 per cent of the 1935-39 average. Sales during the 12 months ending May 31 showed an increase of 8 per cent over the previous 12-month period.

April sales of natural gas were 23.7 per cent higher than those of the same period a year ago, although temperatures, as shown by degree days, was only 6.9 per cent colder.

Shamrock Engaged in Large Expansion Program

Shamrock Oil & Gas Corp. currently has a large expansion program under way to assist in meeting increased consumer's demands in its operating area.

This program was highlighted by the recent purchase of the Magnolia Petroleum Co.'s Sunray gasoline plant which has a capacity of 22,000 gal. daily. In addition, the company is drilling additional gas wells in Sherman County; constructing a 41-mile gas-gathering pipe line; installing additional equipment at its McKee gasoline plant; and is a partner in the construction of a 6-in. finished-products line from the McKee plant to La Junta, Col., where terminal facilities are being built.

Natural Gasoline

Skelly Building Velma Field Gasoline Plant

Construction has been started by Skelly Oil Co. on a natural-gasoline plant in Velma field of Stephens County, Oklahoma. The plant initially will process about 25,000,000 cu. ft. of natural gas daily with an expected output of 50,000 gal. of products daily.

Later the plant is scheduled to double its output.

Skelly, one of the largest operators in the field, is planning construction of a gathering system for the plant, one of the largest in the state and the first in Velma field.

Completion of the project is planned for next summer. James Vaiden, vice president, said the company has contracted for delivery of a minimum of 15,000,000 cu. ft. of processed gas daily to Oklahoma Natural Gas Co. Contractor on the plant is Born Engineering Co., Tulsa.

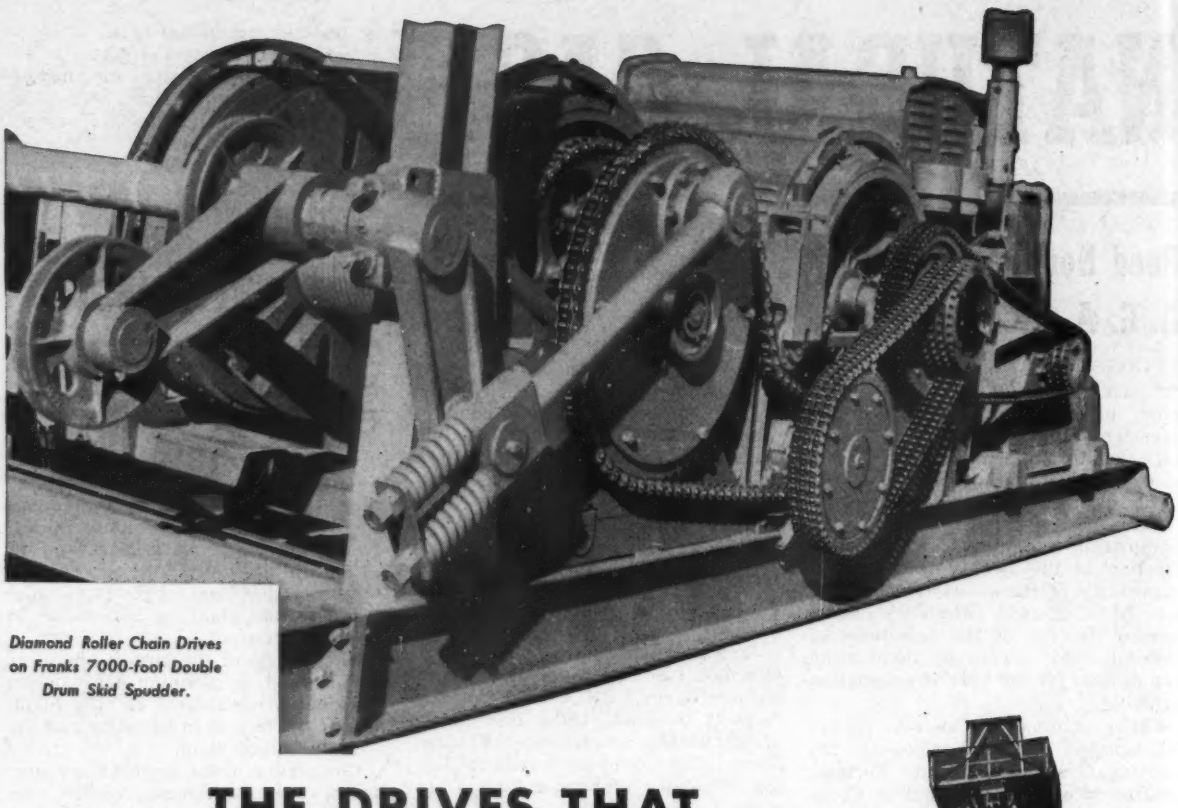
Cranfield Cycling Plant To Be Opened in August

JACKSON, Miss. — The Cranfield cycling plant of Mississippi Cycling Co., being constructed 18 miles east of Natchez, Miss., to serve Cranfield field in Adams County, will be ready for operation in August, according to K. H. Crandall, president. Its operation will require about 50 specially trained employes.

Crandall said the plant is being installed to obtain the highest possible recovery of petroleum hydrocarbons from Cranfield field, and will have a throughput capacity of approximately 100,000,000 cu. ft. of gas per day. The plant will produce large quantities of propane and rectified condensate. Stripped gas will be injected back into the reservoir for pressure maintenance.

Phillips Moves L.P.G. Group

Phillips Petroleum Co. has announced the transfer of its liquefied-petroleum-gas (Philgas) marketing organization from the research and development department to the sales department. K. W. Rugh will continue as manager of the Philgas division of the sales department.



Diamond Roller Chain Drives on Franks 7000-foot Double Drum Skid Spudder.

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Long acknowledged a leader in production of oil field machinery, Franks has likewise been a long-time user of Diamond Roller Chain Drives. As the close-up above shows, this late model double drum skid Spudder is equipped with four drives.

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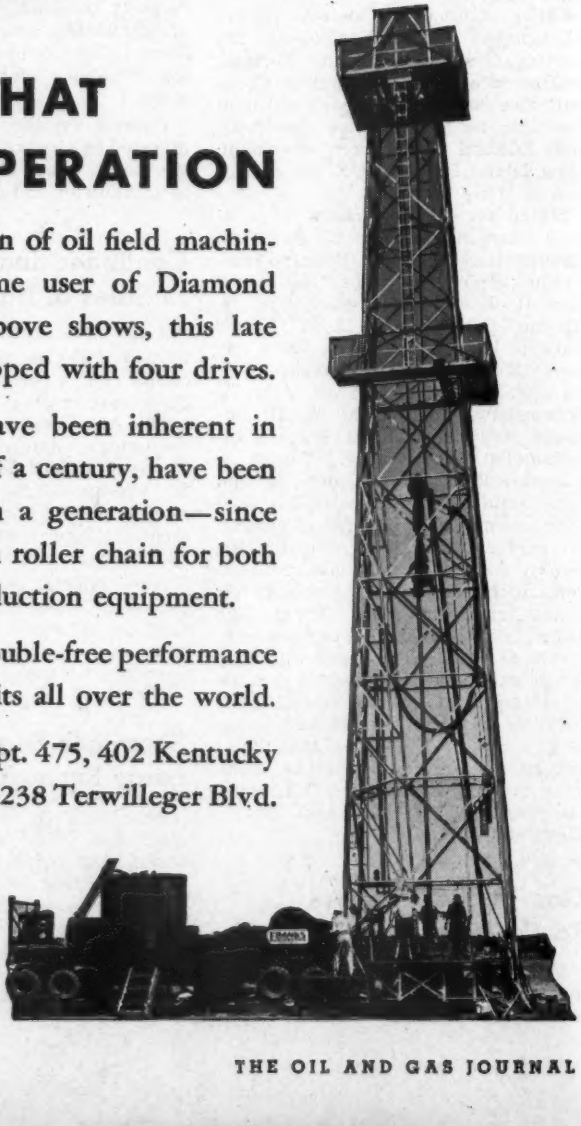

DIAMOND ROLLER CHAINS

Exploration and Drilling

Exploration and Pipe Lines

THE fact that California operators have serious plans for two additional pipe lines to the east will have important repercussions on exploratory plays in hitherto remote portions of New Mexico and Arizona. The big gas line is already moving along with construction at a fast pace. However, it is known that an oil line from West Texas to California, and another gas line from Barker Dome in Northwest New Mexico to California, are both far beyond the conversation stage, and reasonably certain to be built within the next 2 to 3 years.

The Rocky Mountain region has always been handicapped by two things. First, the limited size of the local regional market, and second, the lack of pipe-line outlets to more populous regions where the market is bigger. Expansion of pipe-line outlets has always led to more exploration activity. However, this has always been largely in the northern portion of the region.

The new lines put a definite end to the isolation of western New Mexico and Arizona. A trunk oil line and a trunk gas line will soon be within reasonable reach, affording outlets to the Pacific Coast market. That market is growing by leaps and bounds because of its increased population and industrialization. Many people forget that the Pacific Coast, by and large, has no coal, and depends mostly on petroleum and natural gas for fuel, aided by hydroelectric power.

Exploration Activity

This background accounts for the gradually increasing tempo of interest in exploration in the San Juan basin of Northwest New Mexico, extending some distance into southwestern Colorado, and the initial stirrings of interest in the Black Mesa basin of northeastern Arizona, extending somewhat into southeastern Utah.

The San Juan basin covers about 12,000 sq. miles, and in the deeper portions, will have at least 12,000 ft. of sedimentary section. Several oil and gas fields have been known for many years here, supplying local markets. Barker Dome gas field is the one which will probably be connected to California markets within the next few years. A lot of geological work and some geophysical work have been going on in this basin, on a gradually increasing scale for the past few years. One company has been working with an airborne magnetometer in this area.

There has been less activity over in Arizona in the Black Mesa basin, which is about the same size as the San Juan, and probably has about an equal thickness of sedimentary section to shoot at. A few shallow wells have produced small amounts of oil intermittently since 1908 from the Permian and Pennsylvanian, and there are oil seeps along the San Juan River from the same formation, and in Triassic beds northwest of the area.

Colorado River Salt Basin

North of the San Juan and Black Mesa basins, is another large basin, the Colorado River Salt basin, mostly in southeastern Utah, but extending well into southwestern Colorado. The total area of the basin is on the order of 19,000 sq. miles. In this basin, during the war in course of drilling a well to test for potash and magnesium deposits, shows of oil were found in the Dakota, lower Morrison, and best of all a good show of 43°-gravity oil in the Pennsylvanian around 4,200 ft.

Some 200,000 acres of public lands in Grand and San Juan counties in Utah were withdrawn from under the Public Lands Leasing Act during the war as potash and magnesium reserves. On July 23, these lands will again be open for filing of preference-right applications. Nonpreference-right applications filings open October 23, and pending applications prior to withdrawal will be reinstated upon petition by the original applicant.

If past Rocky Mountain history repeats itself, the comparative isolation of the San Juan and Black Mesa basins will soon be a thing of the past, and the tempo of exploratory activity will steadily increase. Whether this activity will step out as far as the Colorado River Salt basin remains to be seen. Quite possibly it will.

N. CENTRAL TEXAS

Baylor, Young Counties Get New Production

WICHITA FALLS.—New production was reported last week for Baylor and Young counties. One mile northeast of Westover, Baylor County, Ashland Oil & Refining Co. 1 Martin, Block 3,114, TE&L Survey, made initial potential of 62.5 bbl. of oil in 24 hours, on the pump, from Mississippi limestone at 5,420-40 ft. It was drilled to 5,755 ft., in the Ellenburger, before being plugged back for completion. Eight miles southeast of Seymour, and 10 miles west of Ashland's discovery, R. G. Drilling Co. staked location for its 1 J. V. Kysinger, in the A. Baker Survey. It will be a 5,700-ft. test.

In southwestern Young County, Warren Oil Corp. offset a recent gas discovery with a Bend conglomerate oil discovery. Its 2 Bulah Martin, 7½ miles northwest of Eliasville, in the M. DeWitt Survey, made a flowing completion test of 436.8 bbl. of 43°-gravity oil in 24 hours, through ¼-in. tubing choke. Flowing tubing pressure was 110 lb. Completion was from open hole. Top of the Caddo limestone was 3,492 ft., total depth 4,235 ft., with casing set at 4,220 ft. The same operators drilled the Bend conglomerate gas discovery. It is the 1 Martin, and north of the 2 Bulah Martin.

The 1 Martin was drilled to the Ellenburger but plugged back to complete in the Bend at 4,212-17 ft.

In Foard County, Magnolia Petroleum Co.'s wildcat, the 1 A. G. Bell, 19 miles northeast of Foard City, had top of the Mississippi limestone at 5,530 ft., and was drilling below 5,714 ft. Details on several drill-stem tests were not disclosed, but the best was said to have recovered 1,019 ft. of slightly gas-cut mud.

In the southeast corner of Childress County, Amerada Petroleum Corp. 1 Middleton, W&NW Survey, was drilling below 4,800 ft. in shale. In northwestern Montague County, A. R. Dillard 1 M. W. Houpt, 5½ miles southeast of Nocona, was drilling below 5,360 ft. in shale and limestone.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: E. P. Bowen 1 Tubbeville, Blk. 36, Harris Subd., 7 mi. W Archer City, dry, TD 1,463 ft. in sandy shale.

E. B. Clark 1 J. D. Lyles, Sec. 7, Hooper & Wade Sur., A-234, 4 mi. S Mankins, dry, TD 3,781 ft., Strawn 3,535 ft., show oil 3,540 ft.

Foard County: G. A. Kneedler et al 1 Guy G. Crews, Sec. 274, Blk. A, H&TC Sur., 1½ mi. NW Thalia, dry, TD 2,503 ft. in sand.

Wichita County: Continental Oil Co. 1 S. P. Cunningham, Blk. 14, Denton School Land Sur., Lge. 1, SW Wichita Falls townsite, dry, TD 5,560 ft., Caddo 5,332 ft., conglomerate 5,425 ft., Ellenburg 5,525 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Brown County: M. F. Williams and Rose Shadid 1 W. T. Nixon, Blk. 76, J. Burnett Sur., 4 mi. NW Owens, dry, TD 2,507 ft., Caddo 1,953 ft., Marble Falls 2,405 ft.

Haskell County: Calstar Petroleum Co. 1

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3½"	30'
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NEW YORK CITY 20, N. Y.
See Composite Catalog Page 2426

Sylvia M. Foree, R. Hall Sur. 66, 7 mi. NE Haskell, dry, TD 4,400 ft., Home Creek 2,453 ft., dry sand 4,018-59 ft., elev. 1,518 ft.

Shackelford County: L & G Oil & Royalty Co. 1 George DeLafoose, Sec. 9, T&PRR Sur., 12 mi. E Albany, dry, TD 4,46 ft., sand with odor and stain 4,002-4,015 ft., Ellenburger 4,360 ft.

Taylor County: Ungren & Frazier 1 Sealy & Smith Foundation, Lot 1, Grimes School Lands, 3 mi. SE Merkel, dry, TD 2,012 ft., sand with odor 2,080-2,100 ft. limestone with ordor 2,515-28 ft.

SOUTHWEST TEXAS

McMullen County Field Named Little Alamo

CORPUS CHRISTI.—The new oil field opened in McMullen County by Newman Brothers and Skinner & Eddy Corp. 1-B South Texas Syndicate, has been named Little Alamo. Located in E. M. Beall Survey 28, approximately 2 miles southwest of Greens Branch field, the discovery well was completed as a pumper from open hole at 2,286-93 ft. in Queen City sand, making 48.36 bbl. per day of 18.3°-gravity oil, no water. The 2-B well, drilled 933 ft. southwest of the 1-B discovery, and in E. M. Beall Survey 28, was completed in a new deeper pay zone for the field, making 127 bbl. oil per day through a 3/16-in. choke, flowing 28°-gravity oil, with no gas, or water. Tubing pressure was 98 psi., casing 175 psi., and the flow comes through perforations at 4,078-81 ft. in the Carrizo-Wilcox zone. The first Carrizo sand was topped at 3,951 ft., and tested dry gas from that point down to 3,971 ft. on a series of drill-stem tests.

A new gas pool for Duval County has been opened by Rowden & Rowden et al 2 John W. Akin, in GB&CNG RR Survey 186, 11 miles southwest of Freer and 2 miles southeast of Cedro Hill field. Drilled to a total depth of 2,458 ft., with top of pay at 2,443 ft., this well flowed an initial production of 8,500,000 cu. ft. of gas per day open flow through perforations at 2,444-47 ft. The shutin pressure is 900 psi.

In Nueces County, 1 mile west of Agua Dulce and 2½ miles south of Richard King field, Pan American Production Co. and Jack Little, Tr. 1 Loruth Smith Rivers, opened a new gas pool. Total depth is 6,316 ft., with top of pay at 5,528 ft. On initial production test flowed 7,800,000 cu. ft. gas per day and 20 bbl. per day condensate on open flow, shutin pressure 2,100 psi. Production is through perforations at 5,528-39 ft.

There were 40 new locations including 9 wildcats, 2 in Caldwell and 1 each in Dimmit, Kenedy, Milam, Nueces, Starr, and Zavala. The 46 completions included 26 oil, 1 condensate, 4 gas, and 15 dry holes. Four exploratory tests were successful, two new gas pools were opened, one each in Duval and Nueces counties, one new oil field in McMullen County, and one new oil pay in McMullen County. The six dry wildcats were completed two in Starr, and one each in Duval, Jim Wells, Milam, and Webb counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Duval County: New gas pool—Rowden & Rowden et al 2 John W. Akin, in GB&CNG RR Sur. 186, 11 mi. S-SW of Freer and 2 mi. SE of Cedro Hill field, top pay 2,443 ft., TD 2,458 ft., perf. 2,444-47 ft., IP 8,500,000 cu. ft. gas per day on open flow, SIP 900 psi., no water.

McMullen County: New oil field "Little Alamo"—Newman Bros. and Skinner & Eddy Corp. 1-B South Texas Syndicate, in E. M. Beal Sur. 28, 16 mi. SW of Tilden and 14 mi. S-SE of Fowlerton, and 2 mi. SW of Greens Branch field, top pay 2,286 ft. (Queen City sand), TD 2,293 ft., open hole 2,286-93 ft., IP: 48 bbl. oil per day on pump, no gas, gravity 18.3°, no water.

New oil pay Little Alamo field: Newman Bros. and Skinner & Eddy Corp. 2-B South Texas Synd., in E. M. Beal Sur. 28, 933 ft. SW of 1-B South Texas Synd., discovery well, top pay 4,076 ft., TD 4,084 ft., perf. 4,078-81 ft., IP 127 bbl. oil per day through 3/16-in. choke, gas-oil ratio negligible, TP 98 psi., CP 175 psi., gravity 28°, no water.

Nueces County: New gas pool—Pan American Production Co. and Jack Little, Tr. 1 Loruth Smith Rivers, Sec. 26, Richard King Farm Lots Subd., 1 mi. W of Agua Dulce and 2½ mi. S of Richard King field, 3½ mi. W of Agua Dulce field, in R. Garcia Grant, top pay 5,528 ft., TD 6,316 ft., perf. 5,528-39 ft., IP: 7,800,000 cu. ft. gas per day and 20 bbl. per day condensate on open flow, SIP 2,100 psi.

SOUTHWEST TEXAS WILDCAT FAILURES

Duval County: Huff & Klaeger 1 Driscoll Est., in J. Pointevent Sur. 328, 17 mi. NW of San Diego, in Clara area, dry, TD 4,005 ft.

Jim Wells County: Radcliffe Killam 2 Wade, in Wade Ranch, 4 mi. NW of Sandia and 4 mi. N of Wade City, dry, TD 5,203 ft.

Milam County: W. F. Glen 2 E. H. O'Neal, in Jose Leal Sur., 4 mi. NW of Milano, 6 mi. N of Rockdale, dry, TD 1,438 ft.

Starr County: Baldridge & King 2-A Yturria Land & Livestock Co., 2 mi. NW of Sullivan City, in Porcion 100, dry, TD 4,277 ft.

T. B. Hoffer et al 1 Starr Co. Cattle Co., in Lot 37, Share 60-0, Porc. 88 and 89, 15 mi. NE of Rio Grande City, dry, TD 5,516 ft.

Webb County: Texas Co. 2 T. Vasquez, in

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T. Vasquez Sur., 8.1 mi. S from Bruni, dry, TD 1,808 ft.

EASTERN TEXAS

Production Extended in Rodessa Field

DALLAS.—Production in Rodessa field of northeastern Henderson County was extended into Van Zandt County last week at Magnolia Petroleum Co.'s 4 Hearne, Spencer Survey, which flowed 240 bbl. of oil in 24 hours, through ¾4-in. tubing choke. Pay zone is the Rodessa section at 8,886-8,915 ft. In Wood County, lining of Margale and Norman Paul fields, was reported as fairly certain with the logging of a thick pay section in the subClarksville at M. T. Flanagan 1 D. A. Sparham. Details on the well were lacking but operators were said to be setting pipe for a production test. Operators claimed the sand found is the best so far for wells in the area.

In Navarro County, 2 miles southwest of Bazette, J. L. Collins Co. 1 Mrs. Lilly Barnett was preparing for production tests of the Woodbine at 3,248-60 ft. A drill-stem test at that interval, open 1½ hours, produced an instant blow at the surface, with pressure rising to 1,200 lb. in 9 minutes, then dropping back to 100 lb. in 15 minutes. Recovery was three stands of mud cut with gas. There was no water recovered. Total depth is 6,504 ft., plugged back to 3,453 ft.

The Chicago Corp. 1 Evie McDaniels, 2 miles northeast of Dotson, Panola County, had total depth at 6,762 ft., in sand and shale, at its 10,000-ft. Smackover test. A 30-minute test, with packer at 6,600 ft., produced a fair-to-good blow at the surface, but with little pressure, and recovery was one stand of oil-base mud. Plans for further tests at that depth were not announced. In drilling, the Rodessa porosity around 5,536 ft. had shows, as did the Pettit, topped at 6,246 ft. Both had some water.

In Anderson County, Continental Oil Co. 1 F. M. Royall, 2¼ miles northwest of Slocum, was drilling below 7,636 ft. Three miles east of Blackfoot, Sanders & Murchison 1 R. F. Broadway was shut down for repairs at 7,654 ft. in the Glen Rose. In Harrison County, 8 miles northeast of Marshall, Stanolind Oil & Gas Co. 1 Slaughter was drilling below 7,240 ft. in sand and shale, said to be Travis Peak. Slight shows of oil in the Pettit, topped at 6,295 ft., by samples, were not tested. In Kaufman County, north of Kemp, Humble Oil & Refining Co. 1 H. L. Guy had total depth at 9,800 ft., 323 ft. in the Smackover, and was preparing to make sidewall cores.

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CANADIAN FIELDS

Turner Valley North Extension May Be Acidized

CHATHAM.—Home - Millarville 26, LSD 15, 18-21-3w5, is being completed at 8,970 ft. as the most northerly producing well in the Turner Valley North Extension. With Madison limestone contact at 8,541 ft. the well has initial production of 428 bbl., flowing under its own power from the start and without assistance of any kind. It may be acidized to increase output. In North Turner Valley, Home-Millarville 25, LSD 3, 33-20-3w5, is below 8,238 ft. with Madison contact at 8,175 ft. Home 27, LSD 16, 18-21-3w5, offsetting the new producer immediately to the east, has spudded and Home 28 is drilling in LSD 10, 18-21-3w5, immediately south of the producer. Home 29 is drilling in LSD 2, 33-20-3w5, in North Turner Valley and Home 30 has location in LSD 7, same section. Only other drilling test is Foothills Oil & Gas 26, LSD 2, 9-21-3w5, on the east flank of the north extension.

Leduc.—Interest in Leduc field has shifted to the south where McColl-Frontenac Wizard Lake 14-14, LSD 14, 14-48-27w4, is coring below 4,974 ft. and nearing the horizon found productive in the Imperial wells. Location is about 15 miles southwest of the Imperial producers. About 24 miles south, in the same general area, McColl-Frontenac Bigstone Creek 1-20, LSD 1, 20-46-26w4, is coring below 4,531 ft. McColl Frontenac East Wetaskiwin 3-22, LSD 3, 22-46-23w4, some 25 miles southeast of the proven area, is coring below 4,614 ft. after encountering slight porosity with traces of oil. These three tests, all likely to be completed this month, will give some idea of the possibilities of an extensive area between the proven Leduc field and Wetaskiwin.

In the field itself, Imperial-Leduc 5, LSD 8, 21-50-26w4, offsetting the discovery well, is below 4,919 ft. with early completion expected. Imperial has three other wells, all offsets to producers, now drilling. The four producers are making an aggregate of around 638 bbl. daily. Independent operators have three other tests drilling, with seven locations.

In the outlying Millet area, about 12 miles south of the Leduc producers, a group of Alberta companies headed by Calmont Oils, Globe Oils, and British Dominion are sponsoring Millet-Leduc Oils which has let contract to General Petroleums of Calgary for a well in 6-48-24w4. Acreage was furnished by Imperial Oil in consideration of the immediate drilling of a well.

Elk Point.—In the Elk Point area, near Edmonton, Elk Point 6, LSD 3, 26-56-5w4. has finished a commercial gasser at 1,005

ft. and outfit is being moved to Elk Point 5, LSD 9, 23-56-5w4. This area is being jointly developed by Anglo-Canadian Oil Co., Home Oil Co., and Calgary & Edmonton Corp.

Ram River.—In the Central Alberta foothills, Ram River Oils 4, LSD 9, 36-34-10w5, bottoming at 1,440 ft., has completed water shutoff in the Devonian limestone and is testing. Ram River 3, LSD 12, 1-37-11w5, is redrilling below 4,053 ft.

Foremost.—In Foremost field, southern Alberta, McColl-Union 7-13, LSD 7, 13-5-6w4, is finishing a good gasser. McColl-Union 10-B-19, LSD 10, 19-2-7w4, was dry at 2,329 ft.

Medicine Hat.—In Medicine Hat field, southeastern Alberta, Medicine Hat 75, LSD 7, 28-13-6w4, has finished at 1,259 ft. with 2,204,000 cu. ft. initial production. Medicine Hat 76 has location in LSD 6m, 33-13-6w4.

Lloydminster.—In the Alberta end of Lloydminster field, Bee Jay 1, SW3, 15-50-2w4, finished at 2,025 ft., is testing with oil sand at 2,022 ft. Lloydminster Oil Producers 5, SW 13, 11-50-2w4, finished at 2,004 ft., is testing sand at 1,999 ft. In the Lloydsask area, Crest 1, NW 11, 25-48-28w3, finished at 1,916 ft. with oil sand at 1,912 ft. Rogers & Bailey 2, SE 5, 35-48-28w3, bottoming at 1,889 ft., is testing sand at 1,882 ft. Withers-Groat 4, NE 5, 11-49-28w3, testing an area to the north of the field, finished at 1,870 ft. with oil sand at 1,865 ft. and is testing.

Good flush production is being encountered in recent completions by Superior Oil in the northwest extension of the field. Superior 4, LSD 6, 14-50-2w4, with sand at 1,980-89 ft., is flowing around 68 bbl. Superior 7, LSD 3, and Superior 8, NE 6, both in 14-50-2w4, are being put in steady production after bailing initial of 8 bbl. an hour.

Jumping Pound.—Shell 5-7-1, LSD 5, 7-25-4w5, deepening to test the Devonian limestone is below 1,123 ft. after faulting back from the Banff shale to the Madison limestone.

SOUTH LOUISIANA

Stanolind Opens Gas-Producing Area in Cameron

NEW ORLEANS.—Stanolind Oil & Gas Co. 1 George J. McManus has opened a new shallow gas-producing area in the Johnsons Bayou area of Cameron Parish, 20-15s-14w, approximately ½ mile north of the shore line of the Gulf of Mexico, and 9 miles southwest of production in Cameron Meadow field. Total depth is 9,637 ft., with 7-in. pipe set to 9,004 ft. Plugged-back depth is 4,510 ft. Perforations were made at 4,480-88 ft. for completion. On a 12/64-in. choke, the well gaged 1,435,000 cu. ft. of gas per day with 1,750-psi. flowing pressure on the tubing. On a ¼-in. choke the well gaged 2,390,000 cu. ft. of gas per day with 1,500-psi. flowing pressure on the tubing.

Magnolia Petroleum Co. 1 State Lease 684, potential shallow discovery well 25 miles out in the Gulf of Mexico off St. Mary Parish shore, awaits further orders, after several tests failed to show commercially. An initial test through perforations at 2,572-74 ft. recovered 240 ft. of mud with the bottom 10 ft. showing traces of oil and gas. Additional holes were made from 2,572-75 ft. with recovery of traces of oil and gas. These holes were squeezed and another test made through perforations at 2,282-84 ft. Using ¼-in. and 10/64-in. chokes, tool open 1 hour, it blew for 20 minutes, but failed to flow and made a 1,370-ft. recovery of salt water and sand with slight shows of gas.

Magnolia 20 B. T. Wait, deep exploration of Iowa field, Calcasieu Parish, 12-8s-7w, is at a total depth of 10,107 ft. in the salt. This is the deepest test ever drilled in

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the field and is the first hole to encounter the salt. Last log was run to 9,916 ft., and another is being run to the bottom. A number of sands have been credited to the well and hole will probably be plugged back for tests.

The Texas Co. 1 Lafourche Basin Levee District, deep wildcat test in the Queen Bess Island area of Jefferson Parish, 1½ miles west of the 1 State gasser, continues toward the 16,000-ft. level, reporting hard sandy shale while drilling just below 15,523 ft.

There were 20 new locations reported this week, 3 being wildcats, 1 each in Avoyelles, Beauregard, and Vermilion parishes. Six oil wells were completed and three dry holes, all in proven fields.

TEXAS GULF COAST

New Sand Opened at Picket Ridge Field

HOUSTON.—Humble Oil & Refining Co. 1-D Four-Way Ranch Co., wildcat approximately ½ mile southeast of Lolita field, in Jackson County, is completed from a new deep zone through perforations at 7,865-71 ft., flowing 48°-gravity oil at the rate of 55 bbl. per day, with gas-oil ratio of 5,507, and tubing pressure of 2,250 psi. Total depth is 8,556 ft., and 5½-in. casing set to 8,002 ft. for the completion. This test is in the LaWard Farms, in I&GN Survey 11.

A new sand at Pickett Ridge field in Wharton County has been opened by Adrian Moore et al 2 Wilbeck. Total depth is 4,854 ft., and it is completed through perforations at 4,611-16 ft. On potential flow test made 139 bbl. of 24°-gravity oil daily through a ¼-in. choke with gas ratio of 326. Flowing pressure on the tubing was 150 psi., and it has 600 psi. pressure on the casing. This well is located in the J. Telferner Survey.

Henderson Coquat and Continental Oil Co. 1 Frank C. Goodwin, wildcat in Live Oak County, about 1½ miles north of George West townsite, is coring at 7,612 ft. for the Luling sand after having tested good oil for production in the Slick sand of the Wilcox zone. The sand was topped with oil and gas odor at 7,397 ft., and drill-stem test at 7,397-7,404 ft., using a 1,500-ft. water cushion, through ¼-in. chokes top and bottom, flowed the cushion in 30 minutes, with 25 lb. working pressure, and recovered 1,900 ft. of oil and 200 ft. of water with a brackish taste. This well is located in Jacob Matson Survey 25.

Henshaw Brothers and E. H. Smith 1 Beulah Stubblefield et al, outpost test at Bloomington field, in Victoria County, flowed a potential gage of 137 bbl. per day through a ⅛-in. choke, making pipeline oil, no water, with gas-oil ratio of 167. This well is in the south corner of Tract 7, Burton - Wharton - Wilson Subdivision, Francisco Perez Grant, and extends production 2,500 ft. northeastward, out of the Bloomington townsite.

Rowan & Hope 1 Rio Oil Corp., wildcat about 2 miles southwest of the new Yoward field of Bee County, is coring ahead below 7,610 ft. in sand showing gas-condensate, after having tested gas-condensate in the top of the Slick sand. The Slick was topped at 7,518 ft., and drill-stem test at 7,525-45 ft., through ¼-in. chokes, started flowing water cushion, and 550 ft. of condensate-cut water cushion, with bottom-hole pressures of 3,100 lb. open and 3,200 closed. Drill-stem test below that, at 7,550-65 ft., through ¼ and ⅜-in. chokes, yielded similar results. This well is located in the J. R. Carney Survey.

There were 31 new locations reported this week, 10 being wildcats, 1 each in Brazoria, Calhoun, Hardin, Harris, Karnes, Live Oak, Montgomery, Refugio, and Wharton counties. Three successful exploratory wells were completed resulting in a new oil sand for Saratoga field in Hardin County, a new oil sand in Pickett Ridge field, Wharton County, and a new gas-condensate pay in North Vidor pool, Orange County. Four wildcats were dry, two in Bee, and one each in Jackson and Liberty counties.

TEXAS GULF COAST SUCCESSFUL WILDCATS

Hardin County: New oil sand Saratoga field—Sun Oil Co. 3 John McShane, Hardin County School Land Sur. 260, top sand 4,042 ft., TD 6,537 ft., perf. 4,042-64 ft., IP: 141 bbl. oil per day through 10/64-in. choke, gas-oil ratio 978, no water, gravity 41.8°.

Orange County: New gas-condensate pay, North Vidor pool—Gulf Oil Corp. 1 Miller-Vidor Land Co. et al, in J. M. Swisher Sur. 1, TD 8,010 ft., perf. 6,932-39 ft., top sand 6,932 ft., IP: 99 bbl. condensate per day and 5,050,000 cu. ft. gas through ¼-in. choke, gas-condensate ratio 51,023, gravity 50.1°, TD 2,217 psi., no water.

Wharton County: New oil sand, Pickett Ridge field—Adrian Moore et al 1 Wilbeck, in J. Telferner Sur., top sand 4,611 ft., TD 4,854 ft., perf. 4,611-16 ft., IP 139 bbl. oil per day through a ¼-in. in choke, gas-oil ratio 326, TP 150 psi., 14 per cent water, gravity 24°.

TEXAS GULF COAST WILDCAT FAILURES

Bee County: Wm. M. Nichols 1 Asa A. Jones, in D. B. Turner Sur., 8½ mi. W of Beeville, dry, TD 4,500 ft.

Stanolind Oil & Gas Co. 1 Stella W. Russell, in J. P. Smith Sur., 4 mi. S of Pawnee, and 2 mi. W of Old Plummer field, in northwestern Bee County, dry, TD 7,515 ft.

Jackson County: Phil Harris and Alice Faye 1 A. Michalek, in Sec. 9, of C. W.

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WRITE FOR OUR BULLETIN NO. 21

THE BAIRD MANUFACTURING COMPANY

BOX 380, TULSA, OKLAHOMA

Hahl Subd. Hardwood & Burns Ranch, 6½ mi. S of Edna, dry, TD 5,090 ft.

Liberty County: William Helis 1 Mrs. Jane Gonterman et al, in Cottonwood area, D. E. Neville Sur., dry, TD 8,133 ft.

MICHIGAN

Wildcat Offset Promises to Equal Discovery

SAGINAW.—Testing was under way on an offset to the McClanahan Oil Co. wildcat discovery 4 miles west of Pinconning this week. Indications were that the second well would approximate production of the discovery, which continues to produce at near 100 bbl. a day.

A destructive fire that raged for 4 days in a gusher on Garfield Township oil field in Newaygo County was snuffed with steam after causing an estimated $150,000 damage. The Sun Oil Co. gusher caught fire shortly after it came in as one of the best wells in the new field at a rate of 100 bbl. an hour.

Field activities for the past week resulted in 17 completions for 5 oil wells, 5 gas wells, and 7 dry holes, 4 of which were wildcats. Best producers were another Garfield well that flowed 240 bbl. pinched, and a 200-bbl. a day well in Monterery of Allegan County.

Twenty-three new locations were reported as follows: One in Ottawa County, one in Kent, seven in Clare gas fields, five in Garfield-Newaygo, three in Allegan, one in Oceana, one in Livingston, two in Montcalm, one in Osceola, and one in Mecosta.

Michigan crude production showed its usual moderate decline, Michigan Oil and Gas Association figures announcing the current daily average as 41,403 bbl.

MICHIGAN WILDCAT FAILURES

Lapeer County, Dryden Township: James E. Duffy, Jr., 1 Robert E. McClellan, NW NW NW 25-6n-11e, dry in Bass Island formation, TD 2,675 ft.

Montcalm County, Evergreen Township: Rex Oil & Gas Co. 1 George Cleary, NE NE NW 1-10n-6w, dry in Dundee, TD 3,346 ft.

Douglass Township: Leslie T. Barber 1 William A. Thompson et al, SW NE NW 20-11n-7w, dry, TD 1,197 ft.

Tuscola County, Arbela Township: Ervin Major and Fred Riddell 1 Kalman & Nagy, SE SE SE 34-10n-7e, dry in Dundee, TD 2,786 ft.

APPALACHIAN FIELD

Fair Gasser Completed In Elk District

PITTSBURGH.—In Elk district, Kanawha County, Joe Rubin et al completed a fair gas well in the test on Jacob Thumm farm with a final open flow, after shot, of 4,162,000 cu. ft. from the Oriskany sand. From a surface elevation of 816 ft., the Corniferous lime was topped at 5,092 ft., Oriskany 5,207-37 ft., shot 5,219-39 ft., total depth 5,239 ft. Here, United Fuel Gas Co. drilled through the Oriskany in 5,801 Numa Black Coal Co. with a small show of gas only. It is being plugged back to test the Weir.

In Summerville district, Nicholas County, Columbian Carbon Co. completed a wildcat, 960 W. R. Grose, which after acidizing the Injun and Big lime, gaged 553,000 cu. ft. gas. The Big lime was logged at 1,629-1,854 ft., Injun 1,854 ft., gas 1,782 ft., total depth 1,870 ft.

In Upshur County, Warren district, Hope Natural Gas Co. completed 9,131 F. O.

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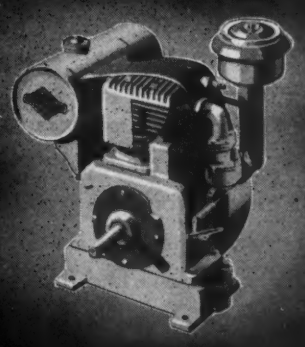

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In Reedy district, Wirt County, Bear Run Oil & Gas Co. completed a test, W. A. Neptune, with a final gage of 1,492,000 cu. ft. gas from the Berea. The Salt sand was logged at 1,760-2,096 ft., oil 1,975-90 ft., Big lime 2,096-2,128 ft., total depth 2,445 ft.

In Ripley district, Jackson County, Hope Natural Gas Co. topped the Corniferous lime at 4,770 ft. and the Oriskany at 4,878 ft. in the test 9,107 Harry Riley. Here, Godfrey L. Cabot, Inc., drilled through the Oriskany sand in the test 1,230 G. W. Harpold with but small shows of gas which did not improve after shot. It is being plugged.

On Chestnut Ridge in Georges Township, Fayette County, southwest Pennsylvania, Manufacturers Light & Heat Co. has made a location for 8 Barton which will be drilled to the Onondaga chert or deeper. This company's 1 George Steve is shut down with a fishing job at 7,687 ft., below the Tully lime, where a gas pocket blew the tools up the hole.

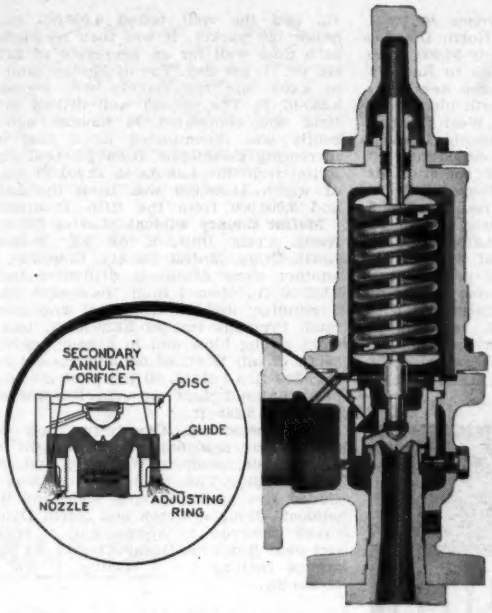
ROCKY MOUNTAIN

Badger Basin Test Gets Good Saturation

DENVER.—General Petroleum Corp. 2 Badura, C NE NW 7-57n-101w, Badger Basin field, Park County, Wyoming, encountered good saturation in the Dakota and on a drill-stem test at 9,445-9,548 ft., open 12 hours, began to flow at the end of 8 hours, and made 10 bbl. natural the last 4 hours. The oil tests 47.8° gravity. Drilling to the objective Tensleep was resumed, but is temporarily delayed by a fishing job at 9,759 ft. It had the top of the Dakota silt at 9,355 ft., and of the Fuson shale at 9,485 ft. Badger Basin was the first structure out in the Big Horn Basin to be drilled to any considerable depth, a discovery being made in 1931 in the Frontier at a total depth of 8,753 ft., producing 55 bbl. per day, the oil testing 50° gravity.

Northwest Elk Basin.—Sinclair-Wyoming Oil Co. 1 Wilkins, NW SW NW 28-9s-23e, Carbon County, Montana, northwest of Elk Basin field, had the top of the Tensleep at 5,912 ft., and made drill-stem test at 5,913-33 ft., open 20 minutes. At the end of 10 minutes it was making gas at the rate of 4,500,000 cu. ft. per day, with a recovery at the end of the test of 90 ft. of distillate. Another at 5,931-62 ft., open 20 minutes, gas at the rate of 2,600,000 cu. ft. was recovered in 10 minutes, and at the end of the test recovered 60 ft. of fluid, of which 50 per cent was distillate. Test at 5,962-6,004 ft., open 15 minutes, showed 2,060,000 cu. ft. of gas in 10 minutes and 2,310,000 cu. ft. in 15 minutes. Previous tests in the Frontier had shows of oil and gas, followed by similar results in the Dakotas, indicating several productive horizons in those formations. Present total depth is 6,086 ft., and hole is being reamed. Last test at 6,005-50 ft. had a recovery of 150 ft. of mud. Results in all horizons indicate that the faults which bisect the anticline between this well and the field proper have considerable depth. In other areas of Elk Basin the faults disappear at the base of the Dakota. The Sinclair-Wyoming well found the top of the Tensleep at —1,442 ft. as against —1,123 ft. in Stanolind Oil & Gas Co. 129 E-T, 1 mile to the east. The latter was completed last April as a pumping well in the Tensleep, making 200 bbl. per day after shooting and shutting off bottom water.

Western Colorado wildcats.—Three wildcats in Rio Blanco County, Colorado, south of Rangely field, on three separate highs, in three unitized areas embracing around 100,000 acres, or more than three times the area of Rangely, are getting under way. The units all adjoin each other and the



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most northerly boundary extends to within a few miles of the nearest Rangely producers. The tests, which will go to the Weber at around 7,500 ft., are from 4 to 9 miles apart. The most southerly location released this week is Superior Oil Co. 2 Government, C N½ SW 33-2s-101w. It is located on the Douglas Creek structure ½ miles northeast of 1 Government drilled by the same interests to 8,564 ft. in 1943. It found the Weber sand hard and tight, but was plugged back to the Dakota-Lakota at 4,326-4,420 ft. and was completed for 9,700,000 cu. ft. of gas per day. Nine miles west and 2 miles north of 2 Government, General Petroleum is getting under way in its 1 Government, C NE SW 24-2c-103w, on West Douglas Creek, a highly faulted anticline with an east-west trend, with cross faults believed to furnish additional closure between the two structures.

The Texas Co. is grading roads to its 1 Unit, NW SE NE 9-2s-101w, North Douglas Creek, which has approximately 54,000 acres in the unit and runs up close to Rangely field. It is 4 miles north of the new location on Douglas Creek. A fourth block containing 13,000 acres west of West Douglas Creek is held by Waldo E. Rennie, Denver.

Beaver Creek gas wells.—Stanolind Oil & Gas Co. is working over some of its gas wells in Beaver Creek, Fremont County, Wyoming, with good results. Its 5 Unit, C SW SE 34-34n-96w, was completed last January at 8,790 ft. for 4,870,000 cu. ft. per day from the Lakota at 8,736-90 ft., marking an extension of the proven area 1 mile northwest of the discovery. It went back into the well and perforated the 7-in. with 180 shots at 8,440-70 ft., resulting in a flow of 18,200,000 cu. ft. per day through the perforations. Packer was set at 8,672 ft., and the well tested 4,000,000 cu. ft. below the packer. It was then recompleted as a dual well for an aggregate of 22,200,000 cu. ft. per day. Top of Muddy sand was at 8,400, and the Dakota was logged at 8,583-97 ft. The second well drilled in the field and completed 18 months ago recently was recompleted as a dual well, increasing production from 8,100,000 cu. ft. initial from the Lakota to 22,000,000 cu. ft., of which 14,000,000 was from the Lakota and 8,000,000 from the fifth Frontier.

Moffat County wildcat.—Carter Oil Co. 1 North Craig Unit, C SE SE 30-8n-90w, North Craig, Moffat County, Colorado, had another show of oil in drill-stem test at 7,942-50 ft., open 1 hour, recovered gas in 2 minutes, and 30 ft. of oil and gas-cut mud. Previous test at 7,829-48 ft. had instant strong blow and in 1 hour recovered 30 ft. of oil, 15 ft. of oil and gas-cut mud, and 240 ft. of fluid, 50 per cent oil and 50 per cent mud. Last top reported was Mesa Verde at 5,285 ft.

New operations.—Twenty-two new operations were reported, of which eight were in Colorado, seven in Wyoming, and seven in Montana. The Colorado locations included five in the Rangely field and three wildcats, Douglas Creek and North Douglas Creek referred to above, and a shallow test near Ridgway, Ouray County, in Hackathorn Drilling Co. 1 Ashing, C SW SW 11-45n-8w.

COLORADO WILDCAT FAILURES

Two Buttes, Prowers County: Ohio Oil Co. 1 Bragg, SE SE NW 29-27s-45w, TD 5,372 ft., plugged and abd. Ground elev. 4,197 ft., sample tops, Dry Creek, 610; Blaine, 950; Fort Riley, 2,330; Pennsylvania, 2,590 ft.; Mississippian, 5,309 ft.

Garden Park, Fremont County: Lorado Oil & Gas Co. 1, SW 33-16s-70w, TD 460 ft. in granite.

WILDCAT FAILURE IN WYOMING

Great Divide, Sweetwater County: Carter Oil Co. 1 Government, C NE NE 13-26s-93w, TD 8,551 ft., plugged and abd. Top Steele formation 8,215 ft. Other tops not available at present. Elev. 7,234 ft. rt.

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ILLINOIS

Gas Discovery in Morgan County in Pennsylvanian

MATTOON.—C. Fielder 1 B. Stedemeyer, SW SE 15-13n-8w, Morgan County, is a gas well in Pennsylvanian sand at 995-1,040 ft., good for 1,500,000 cu. ft. per day. Total depth is 1,040 ft. Pipe was set at 992 ft. and well was treated with 5,000 gal. acid. This test is a rank wildcat located about 12 miles southeast of the abandoned Jacksonville gas pool, and about 23 miles northwest of the North Carlinville oil pool.

Activity in sections 26, 34, 35, and 36 in 4n-9e, Richland County, is stimulated by completion of 3 large wells, all by Central Pipe Line Co. The 1A Fred Correll, SE SW SW 26, the 1B Fred Correll, NE NW NW 36, and the 1 C. S. Correll, NW NE NW 35, all in 4n-9e, each made 1,200 bbl. or more, initial production, from Rosiclare after acid treatment. These wells are located about ¾ mile southwest of production in the North Noble pool.

Between the Geff and West Geff pools, Nation Oil Co. 1 Cisne, NW NW NW 10-1s-7e, is drilling below 3,032 ft. Ben Taylor 1 H. J. Sebastian, NW NE SW 21-1n-2e, is drilling below 1,760 ft. This test is between the Salem and Dix pools. North of the East Flora pool about 1 mile, E. A. Obering 1 Armstrong, NE NE SE 20-3n-7e, is drilling below 2,192 ft.

ILLINOIS SUCCESSFUL WILDCATS

Bond County: Leo V. Horton 1 Kokorudz, SW SE NE 21-6n-2w, IP 7 bbl., in Tren-

ton, 3,151-67, TD 3,167 ft., Glen Dean 714 ft., Barlow 802 ft., Devonian 2,263 ft.

Morgan County: C. Fielder 1 B. Stedemeyer, SW SE 15-13n-8w, IP 1,500,000 cu. ft., Pennsylvanian sand 995-1,040 ft., TD 1,040 ft., 5½-in. set at 992 ft., 5,000 gal. acid.

ILLINOIS WILDCAT FAILURES

Edwards County: Calvert and Willis et al 1 Woods, NE NE NW 30-1s-11w, dry at 3,117 ft.

Fayette County: Kingwood Oil Co. et al 1 Sell, SW NE NE 13-6n-2e, dry at 1,858 ft., Menard 1,294 ft., Glen Dean 1,499 ft., Barlow 1,623 ft., Benoist 1,805 ft.

Gallatin County: C. E. Brehm 1 Bruce, NW SE SW 29-7s-8e, dry at 2,965 ft., Barlow 2,430 ft., Ste. Genevieve 2,804 ft., McClosky 2,854 ft.

Wayne County: Kingwood Oil Co. 1 Melton, SE SW SE 20-1n-5e, dry at 3,068 ft., Glen Dean 2,369 ft., Barlow 2,591 ft., Aux Vases 2,859 ft., Rosiclare 2,928 ft.

White County: B. M. Heath 1 Spencer, NE NE SE 19-5s-10e, dry at 3,245 ft., Upper Kincaid 1,919 ft., Menard 2,276 ft., Barlow 2,743 ft., McClosky 3,106 ft.

OKLAHOMA

First Bromide Well In Southwest Antioch Pool

GLOBE OIL & REFINING CO. et al 1 Carr Community, NW NE SE 29-3n-2w, Garvin County, has been completed in First Bromide at 7,389-99 ft. after extensive testing. The well flowed 29 bbl. 42.7°-gravity oil per hour for 7 hours and gas volume gaged at 556,911 cu. ft. per day. This is the first completion in the Bromide in the Southwest Antioch pool, which produces from Pennsylvanian sands.

Magnolia Petroleum Co. 1 Martin Rose, NW NE 1-4n-4w, Garvin County, the west offset on 40-acre spacing to the East Lindsay pool discovery well, swabbed 42 bbl. oil and 107 bbl. water from perforations in third zone of Pennsylvanian sand, after plugging back from total depth of 10,375 ft. to 7,724 ft. Drill-stem test at 7,655-90 ft. recovered 350 ft. of fluid which was 50 per cent water. Drill-stem test at 10,240-300 ft. recovered 40,000 cu. ft. gas and 1 bbl. oil. Pipe was set at 10,375 ft. Well swabbed 33 bbl. oil in 10 hours from perforations at 10,283-305 ft.

Texas Co. 1 Carter, NW SW NE 25-17n-2e, Lincoln County, topped First Wilcox at 4,717 ft. and Second Wilcox at 4,772 ft. With pipe set at 4,701 ft., well flowed 20 bbl. oil and 170 bbl. water. Drill-stem test at 4,510-25 ft., in Hunton lime, showed 1,000,000 cu. ft. gas per day and recovered 900 ft. oil, 300 ft. mud and 800 ft. water. Well is being plugged back. Hunton was logged at 4,500 ft. and Viola at 4,650 ft.

J. M. Huber Corp. et al 1 Hieronymus, NW SE 3-26n-24w, Harper County, a rank wildcat in the northwest corner of the state, on drill-stem test at 6,200-21 ft. had show of oil and gas and 65 ft. of mud in 30 minutes. Slightly porous lime with small oil show was logged at 6,243-47 ft. Tools are below 6,247 ft., Douglas was topped at 4,210 ft. and Oswald at 5,792 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Creek County: SE extension to Slick pool—Seismograph Service Corp. 1 L. E. Gibson, NE SE SW 26-15n-10e, pumped 21 bbl. of 38°-gravity oil per day from Misener at 3,013-17 ft.; Base Glenn 2,218 ft., Upper Dutcher 2,472-77 ft., Lower Dutcher 2,550 ft., Mississippian 2,725 ft., Woodford 2,980 ft., TD 3,018 ft.

Lincoln County: Sam A. King 1 Bledsoe, NW NE NW 11-13n-6e, flowed 10 bbl. of 38°-gravity oil per day by heads from Prue at 2,924-29 ft.; no other tops reported, TD 2,932 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Wirt Franklin 1 Frensley, NW SW NW 10-5s-2w, dry, TD 5,517

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ft., shaly sand 2,872-2,928 ft., limy sand 3,004-15 ft., shaly sand 4,920-5,063 ft., lime 5,420-30 ft., shale 5,430-5,502 ft., no shows.

Cotton County: Mid Cal Petroleum Co. 1 Bull, NE NE NW 29-2s-9w, dry, TD 2,588 ft., sand 1,154-72 ft., 1,510-34 ft., 2,035-45 ft., 2,203-12 ft., 2,310-25 ft., and 2,582-88 ft., no shows.

J. W. Baldwin 1-B Sarge, NW NE 18-4s-10w, dry, TD 1,510 ft., sand 1,251-53 ft., and 1,411-14 ft., hard sand 1,473-86 ft., no shows.

Hughes County: Kingery & Patterson 1 Bilby "A," NW NW NE 6-6n-9e, dry, TD 2,835 ft., Wewoka 180-240 ft., second Wewoka 380-475 ft., Calvin 588 ft., Senora lime 1,137 ft., Allen sand 1,205 ft., Inola 2,198 ft., Bartlesville 2,270 ft., brown lime 2,532 ft., first Booch 2,685 ft., second Booch 2,809 ft.

Kiowa County: J. P. Morgan 1 Biler, NE NE SE 33-2n-16w, dry, TD 840 ft., no tops reported.

Lincoln County: Westgate - Greenland Oil Co. 1 Strough, NE NE NE 28-15n-5e, dry, TD 3,416 ft., Hogshooter 2,293 ft., Checkerboard 2,590 ft., Cleveland 2,610 ft., Prue 3,385 ft.

Texola Drilling Co. 1 Tolieson, NW SE NW 22-15n-6e, dry, TD 4,273 ft., Mayes 3,775 ft., dense 4,180 ft., dolomite 4,186 ft., sandy dolomite 4,190 ft., Wilcox 4,205 ft. with stain and odor of oil, second dolomite 4,210 ft., sandy dolomite 4,217 ft., second Wilcox 4,232 ft.

Logan County: Smith-Horton 1 Anderson, NE NE SE 14-18n-3w, dry, TD 6,142 ft., Checkerboard 4,822 ft., Oswego 5,020 ft., Mississippian 5,420 ft., Woodford 5,710 ft., Sylvan 5,720 ft., Viola 5,850 ft., Wilcox 6,000-48 ft., second Wilcox 6,093 ft.

Marshall County: Marvin Neff 2 Lewis, NE NE NW 7-5s-5e, dry, TD 400 ft., no tops reported.

Okfuskee County: B. C. Deardorf 1 Getner, SW SE SW 19-13n-8e, dry, TD 4,519 ft., Hogshooter 1,140 ft., Layton 1,250 ft., Checkerboard 1,580 ft., Cleveland 1,670 ft., Oswego 2,430 ft., Prue 2,500 ft., Verdigris 2,765 ft., Skinner 2,770 ft., pink lime 2,950 ft., Red Fork 3,012 ft., Inola 3,170 ft., Bartlesville 3,200 ft., Brown lime 3,360 ft., Dutcher 3,590 ft., Mayes 3,880 ft., Woodford 3,101 ft., Hunton 4,136 ft., Sylvan 4,146 ft.

Gulf Oil Corp. 1 Da-Ko-Tah, NE SE NW 24-13n-8e, dry, TD 4,188 ft., Prue 2,218-2,310 ft., Skinner 2,346-58 ft., Bartlesville 2,916-77 ft., brown lime 3,112 ft., Gilcrease 3,374-80 ft., Union Valley-Cromwell-Dutcher 3,473-94 ft., Mayes 3,780 ft., Woodford 3,970 ft., Misener-Hunton 4,000 ft., Sylvan 4,020 ft., Viola 4,102 ft., dense 4,130 ft., sandy dolomite 4,156-62 ft., lower Wilcox 4,163 ft.

Tillman County: A. C. Bray 1 Koos, C SE SE NW 15-1s-15w, dry, TD 760 ft. in shale, no other tops reported.

A. E. Blair 1 Wolfe, NW SW SW 34-4s-16w, dry, TD 1,820 ft., sand 7140-24 ft., lime 1,024-44 ft.

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PERMIAN BASIN

Gulf's Ector Wildcat Running High in Silurian

MIDLAND.—Gulf Oil Corp. reported its 430-E Goldsmith, Ector County wildcat ¾ mile northwest of its Goldsmith Devonian discovery, was running high on the Silurian. Top of the formation was logged at 5,318 ft. subsea, or 235 ft. higher structurally than the Devonian well. Operators carried it to total depth of 8,495 ft., surface measurement, before stopping to make a drill-stem test. In southern Ector County, Gulf 1-E-A Kewanee-University, ¾ mile southwest of the Jordan Ellenburger discovery, was running 551 ft. lower on the Silurian, at 7,970 ft., than the Jordan well. Operators drilled the 1-E-A Kewanee to 8,280 ft., set packer at 8,230 ft. and took a 1-hour drill-stem test. Gas came to the surface in 10 minutes, reaching a maximum estimated volume of 185,000 cu. ft. daily. Recovery was 1,000 ft. of fluid, of which 640 ft. was clean oil and 360 ft. was heavily oil and gas-cut mud. Operators planned on deepening before making further tests. Also in southern Ector, Humble Oil & Refining Co. 1 Yarbrough & Allen was drilling below 9,046 ft. in limestone. It is a Devonian prospect. Sunray Oil Corp. 1 J. E. Parker, Section 10, Block 44, T&P Survey, a new 10,000-ft. Devonian exploration, was under way and was down below 3,400 ft.

In southern Andrews County, a ½-mile north extension to the Three Bar field was promised at Stanolind Oil & Gas Co. 1-AD University, Section 9, Block 11, University Lands. Operators treated the well with 5,000 gal. at 8,151 ft., plugged-back depth in the Devonian. After treatment, it kicked off and flowed 202 bbl. of oil in 6 hours after cleaning itself into pits. Flow was through ¾-in. tubing choke, cutting 5 per cent acid water and sediment. Following the 6-hour test, it made 306 bbl. of oil through ¼-in. choke, in 21 hours, with little sediment.

Other extensions reported included Humble 1-H Cowden, Section 1, Block 45, T&P Survey, on the south side of Andector field, northwestern Ector County. Treated with 500 gal. of mud acid in the Ellenburger pay zone at 8,455-8,614 ft., total depth, the well flowed 1,625 bbl. of 42.9°-gravity oil on completion tests. Gas-oil ratio was 610 to 1. On the east side of the TXL Ellenburger field, The Texas Co. 3-D Fraser, Section 27, Block 45, T&P Survey, was said to be nearing completion. Details were lacking, but operators said it was an assured ¼-mile extension.

Cities Service Oil Co. 1-H Wooten, southwestern Ector County wildcat, continued swabbing tests after an earlier 25-hour swab recovered 8 bbl. of water and 11 bl. of oil. This recovery was after cleaning out an acid load of 2,000 gal. in the Strawn

limestone at 8,065-8,105 ft. Location is 6½ miles northwest of Judkins.

In Jameson field, Coke County, Sun Oil Co. 3 Fred Jameson was attempting to make a drill-stem test at 6,027-47 ft. Cavings in the hole prevented successful completions of other tests. At 5,856-80 ft., open 40 minutes, it recovered 910 ft. of water blanket and 45 ft. of gas-cut drilling mud. Flowing bottom-hole pressure was 2,400 lb., increasing to 2,950 lb. after shut in. Operators said the test is still in the gas cap of the Crinoidal, and has not yet reached the regular Strawn pay of the field.

WEST TEXAS SUCCESSFUL WILDCAT

Terry County, discovery of Adair field—Amerada Petroleum Corp. 1 Sam Adair, Sec. 4, Blk. C-37, PSL Sur., 8 mi. N Cedar Lake field, swabbed potential of 608 bbl. 33.1°-gravity oil a day through casing set to 4,923 ft., San Andrews 4,400 ft., top pay 4,837 ft., TD 4,945 ft., elev. 3,220 ft.

WEST TEXAS WILDCAT FAILURE

Hockley County: Cascade Petroleum Co. 1 Sam V. Stone, Lab. 23, Lge. 730, State Capitol Lands, 5 mi. NE Levelland, dry, TD 5,200 ft., San Andres 3,970 ft.

TEXAS PANHANDLE WILDCAT FAILURE

Hale County: Wood Oil Co. 1 W. J. Durrett, Sec. 7, Blk. DT, HE&WT Sur., 1½ mi. N Irish field, dry, TD 6,504 ft., anhydrite 1,571 ft., Blaine 3,445 ft., Wichita Albany 5,880 ft., Tubb 5,320 ft., elev. 3,441 ft.

OHIO, KENTUCKY

New Gas Pay Found In Muskingum County

COLUMBUS.—Atha Realty Co. opened up a new productive area in Washington Township, Muskingum County, along the north edge of Zanesville. The well is located on Nathalea Myers in Lot 16, third quarter. Clinton sand at 3,766-3,815 ft. had two pays: 400,000 cu. ft. of gas with some oil at 3,795 ft. and an additional 800,000 cu. ft. of gas at 3,808 ft.

Two wildcat locations have been made in Stark County that will be followed with interest. The Republic Steel Corp. have staked a location on fee property, south of the city of Massillon in Section 19, Perry Township. Frank Lyons et al will test on I. Snode property in Section 20, Lexington Township, 4 miles west of the city of Alliance.

The Preston Oil Co. completed an oil well along the east side of the Hemlock Grove pool that was encouraging. The producer, 3 William McNutt, Section 33, Orange Township, Meigs County, made 30 bbl. in 24 hours after shot.

In western York Township, Morgan County, the Zanesville Tool & Supply 1 Dell Rambo came in as a small gasser in the Medina. Sand was reached at 3,976 ft. and drilled 5 ft. in with an open flow of 200,000 cu. ft. and a rock pressure of 1,160 lb.

Locations totaled 28 with 6 reported in Meigs County, 4 in Perry, and 3 each in Tuscarawas and Muskingum counties. Lancaster led in completions with 6 out of 29.

WILDCAT FAILURE COMPLETED IN OHIO

Muskingum County, Newton Township: John Morrow et al 1 Sidney Courtney, Sec. 24, Clinton 3,672-3,737 ft., Medina 3,793-3,801 ft., TD 3,808 ft., dry.

EASTERN KENTUCKY ACTIVITIES

ASHLAND.—Three completions and a dry hole were noted in the eastern Kentucky field of operations during the week.

Kentucky-West Virginia Gas Co. completed Well No. 953, J. A. Taylor land, Pike County, 3,350 ft., for 286,000 cu. ft. of gas in shale, and 45,000 cu. ft. in Big lime; Well No. 855, Louise Sites, Martin County, 1,417 ft., dry; Well No. 5,726, William Hyden, Johnson County, 3,824 ft., 169,000 cu. ft. in Big 6-Corniferous; Well No. 5,752, G. W. Daniels, Martin County, 803 ft., for 103,000 cu. ft. in Salt sand.

WESTERN KENTUCKY

OWENSBORO.—Carter Oil Co. 2 I. J. Sellers, NE NE SW 22-O-23, Henderson County, is running drill-stem test at 1,855-70 ft. Show of oil was logged at 1,859-65 ft. in Tar Springs. Menard was logged at 1,657 ft. and Viola at 1,802 ft.

Russel P. Johnson 1 O. C. Whitefield, 1-K-25, Hopkins County, drilled to 2,967 ft., has pipe set at 2,291 ft. to test Tar Springs logged at 2,300-20 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Butler County: Gurley Smith et al 1 H. Smith, 18-I-32, dry at 1,018 ft.

Muhlenberg County: F. H. Venerier 1 Craig, 15-I-32, dry at 1,235 ft., Viola 1,055 ft., Glen Dean 1,107 ft., Golconda 1,160 ft.

Webster County: F. J. Fleming et al 1B Melton 7-N-23, dry at 2,807 ft., Menard 1,727 ft., Viola 1,883 ft., Tar Springs 1,931 ft., Renault 2,502 ft., and Ste. Genevieve 2,626 ft.

INDIANA

EVANSVILLE.—Princeton Mining Co. 1 McCarty, SE NW NE 13-2s-10w, Gibson County, on drill-stem test at 2,137-47 ft. in McClosky lime, had gas at the surface in 34 minutes, and recovered 390 ft. clean oil, 60 ft. of oil-cut mud, and no water. This test is located about 2 miles from production in the North Princeton pool.

Glen F. Cullison 1 Kendel, NW NW SW 34-1s-10w, Gibson County, which showed free oil at total depth of 2,050 ft., but which made water after shot, is plugged back to 1,760 ft. to test Cypress at 1,734-50 ft.

Steve Zanetis 1 Gelliot, Survey 9, 10, 11, 12-3n-10w, Knox County, has pipe set at

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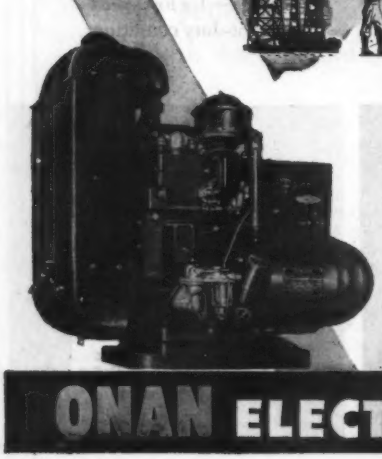

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ONAN ELECTRIC PLANTS

1,865 ft. to test Rosiclare logged at 1,871-91 ft. Total depth is 1,891 ft.

Carter Oil Co. 1 Hale, NE NE SE 19-4s-13w, Posey County, is drilling below 2,793 ft. after drill-stem test at 2,082-94 ft. recovered gas, 105 ft. of muddy oil and 120 ft. of water.

INDIANA WILDCAT FAILURES

Gibson County: George-Wrather 1 Blood, NW NW NE 22-3s-13w, dry at 2,870 ft., Menard 1,989 ft., Aux Vases 2,703 ft., Fredonia 2,780 ft., McClosky 2,823 ft.

Vigo County: Claude Sutherland 1 Stirwalt Heirs, NE NE 20-10n-10w, dry at 987 ft.

KANSAS

Good Arbuckle Prospect In Stafford County

SOHIO PETROLEUM CO. 1 Schrepel, SE SE SE 12-21s-12w, Stafford County, filled 2,400 ft. with oil in 1 hour from Arbuckle lime, and at the end of 8 hours oil stood at 2,900 ft. Pipe was set on top of the Arbuckle at 3,480 ft. and hole was drilled to 3,515 ft. Lansing was logged at 3,185 ft., conglomerate at 3,426 ft., and Simpson at 3,436 ft.

Keyes Drilling Co. 1 Marshall, NW NW NW 25-11s-18w, Cowley County, filled 2,000 ft. with oil in 1 hour and swabbed 30 bbl. oil per hour for 4 hours from 2,000 ft. off bottom. Producing zone is a 2-ft. section at 6 to 8 ft. in the Arbuckle lime. Pipe was set 4 ft. below the top of the Arbuckle at 3,622 ft. and hole was drilled to 3,624 ft. Lansing was logged at 3,313 ft., conglomerate at 3,560 ft., and Simpson at 3,574 ft.

Carter Oil Co. 1 Davis, NE SW 12-33s-2w, Sumner County, is assigned a maximum potential of 3,000 bbl. Production is from top 3 ft. of Simpson which was found at 4,241 ft. This is a south offset on 40-acre spacing to the Falcon Seaboard Drilling Co. 1 Skaggs, SE NW 12-33s-2w, which was completed in May with a potential of 1,578 bbl. This test revived interest in the old Perth pool which was opened in 1945 by Carter Oil Co. 1 Latimer, NW NE 12-33s-2w, which was a small Simpson well.

Bennett & Roberts Drilling Co. et al has set pipe in 1 Rush, NW NW NE 9-6s-22w, Graham County, to test oil shows in Lansing which was logged at 3,487 ft. The hole was drilled to 3,873 ft., which penetrated Arbuckle 52 ft.

Continental Oil Co. has pipe set 2 ft. in Arbuckle at 3,489 ft. in 1 Gilbert, NE NE SE 6-9s-18w, Rooks County, to test oil show. Total depth is 3,491 ft. The well is about 2 miles east of the Barry pool.

KANSAS WILDCAT FAILURES

Cowley County: Continental 1 E. L. Kropp, NW NW SW 26-30s-3e, dry, TD 3,423 ft., Kansas City 2,450 ft., Mississippian 3,015 ft., Arbuckle 3,400 ft.

B. C. Hyde 1 Mueller, NW SW 36-33s-4e, dry, TD 3,071 ft., no tops reported.

Mid-Plains 1 Shaver, NW SW SW 7-33s-8e, dry, TD 2,917 ft., Lansing 1,610 ft., Layton 2,043 ft., Kansas City 2,237 ft., Fort Scott 2,531 ft., Cherokee 2,806 ft., Mississippian 2,874 ft.

Wakefield & Kanotex 1 Goatley, C W½ SW NE 5-35s-5e, dry, TD 3,040 ft., Bartlesville zone 2,935 ft., base Bartlesville 2,990 ft., Mississippian 3,036 ft.

Marion County: Lion & Veeder Supply 1 Penner, SW NE 17-20s-2e, dry, TD 3,200 ft., Lansing 2,046 ft., Mississippian 2,628 ft., Kinderhook 2,789 ft., Viola 3,000 ft., Simpson dolomite 3,069 ft., Arbuckle 3,148 ft.

Rooks County: Cities Service 1 Beisner, SW cor. 25-9s-16w, dry, TD 3,609 ft., Heebner 3,178 ft., Lansing 3,217 ft., Arbuckle 3,593 ft.

Westgate-Greenland Oil 1 Henderson, SE SE NW 23-9s-18w, dry, TD 3,700 ft., anhydrite 1,540-90 ft., Heebner 3,284 ft., Lansing 3,362 ft., conglomerate 3,612 ft., Simpson dolomite 3,654-60 ft., Simpson 3,643 ft., Arbuckle 3,674 ft.

Sunray 1 Choquette, NE NE SE 13-9s-20w,

dry, TD 3,630 ft., Heebner 3,278 ft., Toronto 3,299 ft., Lansing 3,319 ft., basal Kansas City 3,528 ft., conglomerate 3,571 ft., Arbuckle 3,600 ft.

Stafford County: Stanolind Oil & Gas 1 Anne J. Moses, SE SE SW 17-22s-13w, dry, TD 3,900 ft., anhydrite 776 ft., Lansing 3,468 ft., Viola 3,786 ft., Simpson 3,831 ft., Arbuckle 3,875 ft.

Alpine Oil Co. 1 Hill, NW NW NE 11-23s-12w, dry, TD 3,710 ft., anhydrite 585 ft., Lansing 3,285 ft., Cotton Valley 3,586 ft., Simpson 3,595 ft., Arbuckle 3,618 ft.

LA.-ARK.

Wildcat Dicovery Looks Like Good Gas Producer

SHREVEPORT.—In DeSoto Parish, 1 mile southwest of Holly field, Guy Mabee Drilling Co. 1 H. B. Sample, in 7-13n-13w, was shut in after making several flows of gas. The wildcat discovery was estimated good for 3,000,000 to 4,000,000 cu. ft. of gas a day, open flow. From perforations at 2,842-45 ft., open 11 minutes, the surface pressure was 240 lb. Additional perforations at 2,835-40, 2,828-33, and 2,823-26 ft. increased the tubing and casing pressure to 700 lb. before it was shut in. Total depth at 2,899 ft., in the Paluxy. Formation tops looged were the Saratoga 1,476 ft., base Austin 2,770 ft., and a broken oil sand at 2,823-45 ft.

In Union Parish, F. B. King et al 1 N. W. Norris, 26-22n-1w, was ready for completion as a 1-mile south extension to Ora field. Bottomed at 2,176 ft in the Nacatoch it made initial potential of 166 bbl. of fluid a day, testing 86 per cent oil, of 29.4° gravity. Pay level was 2,168-74 ft.

Northeast of Saline, in Bienville Parish, Union Producing Co. and Pure Oil Co. 1 L. P. Frazier, 14-14n-6w, had total depth at 3,915 ft. A drill-stem test at 3,909-15 ft., open 15 minutes, recovered 1,400 ft. of salt water with a very slight show of gas. M. A. Halsey 1-B Skidmore, Pettit test 2½ miles northeast of Elm Grove field in 1-16n-11w, was drilling below 4,902 ft. in the lower Glen Rose. Cores at 4,570-90 ft. recovered shale and limestone, with no shows, then hard dense limestone and 1 ft. of porous oolitic lime. In Catahoula Parish, Pan American Producing Co. 1 L. R. McGraw, 24-10n-8e, was drilling below 4,387 ft. in Wilcox. Operators plan to stop to make an electric survey at 4,500 ft.

In Arkansas, McAlester Fuel Co. 1-A McDonald, SW NW 23-17s-24w, Lafayette County, was reported drilling below 6,580 ft. In Nevada County, Hunt Oil Co. 1 Bodcaw Oil Co., 36-14s-23w, was below 4,065 ft. in shale and limestone.

NORTH LOUISIANA WILDCAT FAILURES

Bienville Parish: Nelson B. Hunt 1 Nebo Oil Co., SE NW 33-16n-7w, dry, TD 8,260 ft., no tops reported.

Richland Parish: Mitchell & Anderson 1 Myrick-Tisdale, SE SE 12-17n-5e, dry, TD 3,820 ft., Wilcox 1,115 ft., Midway 1,857 ft., Glenrose 2,377 ft.

Union Parish: W. L. Stokes 1 Futch, SE SE SW 9-22n-1w, dry, TD 2,258 ft., chalk 2,043 ft., sand 2,204 ft.

T. L. James & Co. 1 G. H. Miller, 36-23n-2w, dry, TD 6,923 ft., no tops reported.

Roberts & Smith 1 Farmersville Bank, SE SW 23-22n-1w, dry, TD 2,202 ft., no tops reported.

ARKANSAS SUCCESSFUL WILDCAT

Lafayette County: McAlester Fuel Co. 1-A Cap Lee, NE SW 24-17s-24w, flowed 120 bbl. of 48.8°-gravity oil in 19 hours, through a 10/64-in. choke, from Smackover at 9,044-54 ft., TD 9,086 ft.

ARKANSAS WILDCAT FAILURE

Union County: Arrow Drilling Co. 2-A Union Saw Mill, NW NW SE 8-18s-12w, dry, TD 3,325 ft.

MISSISSIPPI

Carter Test Drilling Ahead Below 6,155 Ft.

JACKSON.—Carter Oil Co. 1 Medie Morgan, northwest of Yazoo City in SW NE 9-12n-3w, was drilling ahead below 6,155 ft. in red shale, after reporting a drilling break at 5,990 ft. Circulation at that depth returned no shows. Running 150 ft. higher on the chalk than the same operators' 1 Carl Day, tops logged were reported to be Wilcox 2,018 ft., Midway 4,007 ft., Selma 4,820 ft., Woodruff sand 4,989 ft., base of chalk 5,112 ft., and top of volcanics 5,112 ft. It was still in the volcanics at 6,155 ft.

Two Rankin County exploration tests were drilling, with no shows reported. Three miles south of Starr, R. B. Lack-W. G. Nelson Exploration Co. 1 L. E. Ridgeway, 35-3n-3e, was below 8,140 ft. in shale and sand, on a scheduled 9,500-ft. test. In 7-8n-5e, Lion Oil Co. 1 W. G. Sowell was reaming at 7,635 ft. in the Tuscaloosa. Cores at 7,537-42 ft. recovered white, salt water sand; then green shale, running into dark red and gray, mottled shale. At 7,609-15 ft. the recovery was 5 ft. of interbedded sand and shale, with no shows.

In Attala County, Stanolind Oil & Gas Co. 1 C. E. Steed found the lower Cretaceous dry and was reported going to the Knox dolomite. Location is SE SW 4-13n-6e, Top of the lower Cretaceous was reported at 4,540 ft., with operators now drilling below 6,545 ft. Sample tops are: Chalk 2,450 ft., Eutaw 3,2440 ft., Tuscaloosa 3,890 ft., and the Massive sand at 4,472 ft.

In Clay County, Atlantic Refining Co. 1 R. G. Dunning, NW SW 12-19n-16e, east of

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Tibber, was drilling below 9,020 ft. Original contract depth was 9,000 ft., but operators were to carry it on to 9,500 ft.

MISSISSIPPI WILDCAT FAILURES

Marion County: S. W. Richardson 1 Pearl Randall, 18-5n-17w, dry, TD 10,154 ft., Wilcox 3,217 ft., Midway 6,193 ft., Austin 8,280-8,573 ft., Tuscaloosa 8,782 ft.

Rankin County: Lion Oil Co. 1 W. G. Sowell, 7-5n-5e, dry, TD 7,808 ft., Midway 4,120 ft., chalk 4,898 ft., Eutaw 6,090 ft., Tuscaloosa 6,635 ft., Massive sand 7,463 ft.

CALIFORNIA

Gas Strike Northwest of Cymric Field

LOS ANGELES. — Rothschild-Bender Oil Operations has completed its wildcat 1½ miles northwest of the Cymric field, the 8 Sheep Springs, 17-29s-21e, Kern County, as a new gas discovery. On a 3-hour test the well flowed at the rate of 20,000,000 cu. ft. of gas daily with 1,500 psi. flowing pressure. No condensates were recovered during the test. Gas is coming from the Oceanic sand which was topped at a depth of 4,820 ft. When it was first drilled into this sand, the well blew out of control and considerable difficulty was experienced in controlling the gas. A fishing job also delayed completion of the well, and operators were finally forced to cement the stuck 4½-in. drill pipe at 4,904 ft. The drill pipe was then perforated at 4,810-23 ft. and 4,828-40 ft. and 2-in. tubing run to 4,738 ft. for completion. Elevation of the well is 865 ft. and the total depth is 4,904 ft.

Independent Exploration Co. 11 Cymric, 21-29s-21e, an offset test to the new discovery, has reached a depth of 4,923 ft. and 7-in. casing has been cemented at 4,847 ft. preparatory to completion. The 11 Cymric topped the Oceanic sand at 4,847 ft. and the base of the same sand at 4,910 ft.

The Sharples Oil Corp. has completed its extension well in the Northeast Coalinga area, the 1 Hyde, 6-19s-16e, as an oil well good for approximately 150 bbl. daily. Producing by gas lift the well made 100 bbl. in 5½ hours during initial test. Fluid produced was approximately 70 per cent water. At latest reports the well was making fluid at the rate of 130 bbl. every 18 hours and the water cut had dropped to approximately 30 per cent. The well was drilled to a total depth of 8,900 ft. and plugged back to 8,380 ft. Seven-in. casing was set on the plug for completion.

Union Oil Co. is continuing its persistent exploration campaign with a new wildcat venture approximately 2 miles east of the Gato Ridge field in Santa Barbara County. The new test will be known as the 1 Giorgio and it will be located in 12-8n-32w. Location is ½ mile north of General Petroleum Corp. 1 Giorgio, an unsuccessful venture which went to a total depth of 1,225 ft. in basalt before being abandoned late in 1942.

Meanwhile, Union has completed its extension test of the West Mountain field in Ventura County as a flowing well. This test is the 1 Henderson, 23-3n-21w, and latest gages indicate it to be flowing approximately 100 bbl. daily, although it is reported to be making a large amount of water. Total depth is 4,950 ft.

In the Athens Heights area of Los Angeles County, Shell Oil Co. is one step nearer completion of its prospective discovery, the 1 Union-Poindexter, 12-3s-14w. Water shut-off has been made successfully on the 7-in. casing set at 8,882 ft. and operators are reaming at the present time. The well is bottomed at 9,272 ft. and reportedly encountered a well-saturated oil sand section near this depth.

CALIFORNIA SUCCESSFUL WILDCATS

Fresno County, Northeast Coalinga Area: Sharples Oil Corp. 1 Hyde, 6-19s-16e, comp. on gas lift, 130 bbl. in 18 hours, 30 per cent cut, elev. 598 ft., TD 8,900 ft.

Kern County, Cymric Area: Rothschild-Bender Oil Operations 8 Sheep Springs, 17-29s-21e, IP 20,000,000 cu. ft. gas, no condensates, perf. 4,810-23 ft. and 4,828-40 ft., elev. 865 ft., TD 4,904 ft.

Solano County, Dixon Area: Amerada Petroleum Corp. 1 Marie Wineman, 22-6n-2e, IP 1,780,000 cu. ft. gas through 3/16-in. choke, elev. 23 ft., TD 4,883 ft.

Ventura County, Simi Area: Union Oil Co. 4 C. D. L. B., 32-3n-18w, flowed 65 bbl. per day, gravity 16.2°, elev. 1,000 ft., TD 2,867 ft.

West Mountain Area: Union Oil Co. 1 Henderson, 23-3n-21w, flowed 80 bbl. per day, elev. 918 ft., TD 4,950 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Cantua Creek Area: Cantua Creek Oil Co. 1 S. P., 3-17s-15e, dry, elev. 363 ft., TD 6,552 ft.

Kern County, Cymric Area: Independent Exploration Co. et al 3 Roco, 18-29s-21e, dry, elev. 959 ft., TD 2,315 ft.

McKittrick Area: Wilshire Oil Co., Inc., 3

(Continued on page 143)

Industry's Current Operating Level

(Continued from page 49)

firmly established on a steel efficiency basis during the war. It was but natural, therefore, that following the war the greatest growth of demand would come in the midwestern market which had had a background of satisfactory experience. Such an expansion has taken place, and the oil industry is even now hard pressed to meet requirements for this fuel, as well as for burning oils and gasolines.

The transportation facilities into the Midwest have had to absorb a dual impact of reduced local production of crude oil and a greatly expanded demand. Limitations on supplies of various refined products may be characteristic in the market for a few months until construction can correct the deficiencies. No really significant hardship should result, however, if each supplier takes care of his regular customers on the same basis as last year. I believe the situation is being handled on a fair and reasonable basis and if the public will be careful in the use of petroleum products, there will be no real hardship. There are several pipe-line projects and refinery-expansion programs under way which should relieve some of the tension in the latter part of 1947 or early in 1948. Tank cars are increasingly becoming available to move into the Midwest and additional barge capacity is available.

The Government's Task

I believe the industry has taken practically all emergency steps possible to meet the problem. Hence there does not appear to be much that the Government needs to do except to insure the freedom necessary for investment to build the physical facilities to meet the long-range needs of the consumer. The economic atmosphere of free enterprise will provide quickest solution.

A great deal of editorial question has been raised recently concerning exports of petroleum. This country has a net import balance of petroleum and we must recognize that there are many sections of the world to which our exports are destined as badly in need of oil as we are. I do not believe a sound policy can be outlined on this question without considering a wide ramification of related subjects, many of which go beyond the realm of information available to industry representatives. Hence we do not advocate any specific program on this part of the problem.

Naturally, more pipe for drilling and transporting would be of assistance. However, I feel that the steel industry has done and is doing a remarkable job in supplying the oil industry the tonnage that it is receiving. I am satisfied that the delivery rate will be increased as the pent-up demand for many semidurable goods becomes satisfied. Exports of pipe have frequently been challenged. There are several sections of the world where line pipe can be utilized and it will contribute as much to the solution of our domestic problem as it would if used locally. I do not feel that general or blanket orders with respect to export of steel pipe can be established.

Title to 30 More U. S. Tankers Transferred

WASHINGTON. — A list of war-built merchant vessels, including 30 tankers, on which title was transferred during April and May, has been announced by the U. S. Maritime Commission.

All the tankers are of the T2-SE-A1 type with the exception of one T3-SE-A1 listed as sold to Hillcone Steamship Co. for United States registry.

Of the 30 tankers, 11 passed to Panamanian registry, 9 United States, 5 British, 4 Italian, and 1 Belgian. Largest buyer of the group was Overseas Tankship Corp. which purchased 11 vessels for transfer to Panamanian registry.

Others were: Government of Italy, Italian registry, four; Anglo-Saxon Petroleum Co., Ltd., British registry, three; Gulf Oil Corp., U. S. registry, two; and one each to the following: North American Shipping & Trading Co., U. S.; Std. Amer. Petroleum Co., Belgian; Oriental Trade & Transport Co., British; Cities Service Oil Co., U. S.; British Tanker Co., Ltd., British; Charles Kurz & Co., Inc., U. S.; The California Oil Co., U. S.; Petrol Tanker Ind., Inc., U. S.; and Trinidad Corp., U. S.

Among the

Drilling Contractors

Charles Cross, Virgil, Kans., is moving in material for the Nadel & Gussman 1 Farmer, SW NE SE 30-20-10e, a wildcat in Lyon County, Kansas.

Kingery Brothers Drilling Co., Saint Jo, Tex., has filed intention to drill its 1 Brady, NW SW NW 32-1s-2w, a 2,500-ft. test in Stephens County, Oklahoma.

Kiowa Drilling Co., Wichita, has brought in an oiler for Solar Oil Co. at an estimated 100 bbl. per hour. This Arbuckle test is the 1 Tammen, SW SW SW 24-19-16, Rush County, Kansas.

Jackson Drilling Co., Tulsa, has completed two oil producers in Garvin County, Oklahoma, the 7 and 8 Russell, NE NW 24-1n-1w. Well 7 flowed 100 bbl. per day through a 10/16-in. choke and well 8 pumped 10 bbl. per day.

Big Six Drilling Co., Houston, has been given contract to drill H. C. Starkey 1 Anderson & Pearce, wildcat test 3 miles west of Cistern field, Fayette County, Texas, and operations are to get under way before July 15. Contract depth is 3,000 ft.

Anderson Drilling Co., Oklahoma City, has staked location for its 2 Stover, NW NE SE 13-2s-13w, Cotton County, Oklahoma.

J. D. Frizzell is preparing to drill his 2 Johnson, NW NE SE 18-1s-8w, Stephens County, Oklahoma.

H. E. R. Drilling Co., Oklahoma City, has staked location for its 1 Burr, NW NW SE 19-25n-1e, northeast of Tonkawa field, southern Kay County, Oklahoma.

Braden & Greene Drilling Co. is preparing to drill a wildcat 9 miles northeast of Hutchinson, Reno County, Kansas. The test is the 1 Goetzen, SW SW SW 12-22-5, 3 miles north of Buhler pool.

Shaw Petroleums, Lloydminster, Sask., are finishing Dalo 5, LSD 9, 15-50-2w4, in the northwest extension of the Lloydminster field.

R. W. Matlock has the contract for a wildcat, the Knickerbocker-Zim-

Day-tour crew on one of Parker Drilling Co.'s seven rigs running in Brookhaven field in Lincoln County, southwestern Mississippi. The men are: Roy J. May, R. R. Daniel, W. H. Son (driller), L. C. Daniel, and James Canon

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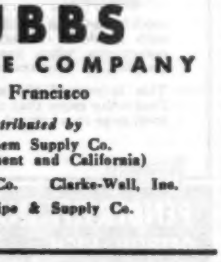

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merman and Daniels 1 J. O. Mutch, C NW NW 3-10n-1w, Gratiot County, Michigan.

Basin Drilling Co., Owensboro, Ky., is drilling a well in Webster County, Kentucky, for Derby Oil Co. and W. A. Moncrief.

Keyes Drilling Co., Elmwood, Kans., has hit a good well 1 mile south of Burnett pool, Ellis County, Kansas. Its 1 Marshall, NW NW NW 25-11-18, swabbed 30 bbl. of oil per hour for 4 hours from the Arbuckle at 3,618 ft.

Paul Doran, Vandalia, Ill., has the contract for a Jefferson County, Illinois wildcat, the Fleming-Swann-Gilliam-Dedman 1 C. H. Willoughby, NW NW NE 34-1s-1e.

Hartman & Jordan, Mt. Vernon, Ill., have set surface pipe on a wildcat, the Carter Oil Co. 1 J. E. Hale, NE NE SE 19-4s-13w, Posey County, Indiana.

Barlow Brothers, Lloydminster, Sask., are completing contract for B. & H. 1, NW 5, 1-49-28w3, in the Saskatchewan section of the Lloydminster field.

Cook Drilling Co. is testing the Wilburn sand pay at 4,861-69 ft. in their 1 Anderson, C N½ NE SW 11-11n-3e, Vaughan-Pickens field, Madison County, Mississippi.

Commonwealth Drilling Co., Calgary, Alta., has started Command 9, SW 4, 13-47-27w3, in the southeast portion of the Lloydminster field.

Crow Drilling Co., Shreveport, has set surface pipe on a Florida wildcat for Magnolia Petroleum Co. This test is the 1-A Florida State Block 5-B and is 78 ft. east of 1 Florida State Block 5-B in unsurveyed territory.

Smith-Horton Drilling Co., Tulsa, has filed intention to drill the 1 Watson, SW NW SW 27-1n-9w, a 4,700-ft. test in Stephens County, Oklahoma, and the L. Miller, NW NE NE 16-12n-7e, a 3,600-ft. test in Okfuskee County, Oklahoma.

Dixie Drilling Co., Dallas, has brought in a producer, the W. Wright-L&G Oil & Royalty Co. 1 Ira Case Smith, 330 ft. from north and east lines, SW SE 7-7n-7e, Lincoln County, Mississippi. The well produced 35 bbl. per day by pumping.

Karels & Federspeil, Regina, Sask., have contract for Herschel 1, SW 14, 25-48-28w3, in the Lloydminster field.

Parker Drilling Co., Tulsa, has completed an oil well for Gulf Refining Co. in Wayne County, Mississippi, for 125 bbl. per day through 11/64-in. choke on tubing. The well is the 5 Lillie M. Johnston et al., C SW NE NW 34-10n-9w, in the Eucutta field.

Big West Drilling Co., Fort Worth, has opened a new field in Shackelford County, Texas, with its Hendrick A-12, Section 8, Block A, AB&M Survey, 18 miles northwest of Albany. The well flowed into pits from the Ellenberger at 5,257-63 ft.

Commonwealth Drilling Co., Calgary, Alta., is working on drilling contract for Highwood Sarcee Oils in the Dina-Ribstone area, outlying the Lloydminster field. First well has spudded in LSD 9, 12-45-1w4.

Woods Drilling Co., New Orleans, is moving in to drill a wildcat in Logan County, Oklahoma. The test will be to the second Wilcox and is in SE SW NW 7-16n-1w.

C-G Drilling Co. has set surface pipe on the Musgrove Petroleum Corp. & O. J. Fleming 1 Hock, SW SW NE 24-15-11, a wildcat 3 miles northwest of Vacek pool, Russell County, Kansas.

McQueen & Clevenger, Fort Worth, has the contract for a Continental Oil Co. wildcat, the 1 Royce Lankford, SE SE 2-14s-26e, 1½ miles northeast of Hagerman, southern Chaves County,

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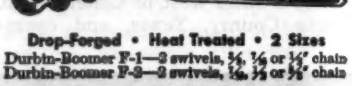

Drop-Forged • Heat Treated • 2 Sizes
Durbin-Boomer F-1—2 swivels, ¼, ⅛ or ½" chain
Durbin-Boomer F-2—2 swivels, ⅛, ⅜ or ⅝" chain

Malleable Iron • Heat Treated • 5 Sizes
MIDGET No. 1—1 swivel, ¼" chain
DEE-TA No. 1—1 swivel, ⅛ or ⅜" chain
DIXIE No. 1—2 swivels, ⅛ or ½" chain
LONE STAR 1—2 swivels, ⅛, ⅜ or ⅝" chain
LONE STAR 2—2 swivels, ⅛, ½ or ⅝" chain

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STANDCO BRAKE LINING

Is the drillers best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims See pages 3608-3613, Composite Catalog.

Standco Brake Lining Co.
HOUSTON

New Mexico. The well is in the center of a 6,000-acre block.

Brown & Eakle Drilling Co., Carmi, Ill., has the contract for the Phillips Petroleum Co. 1 Epper, NE NE NE 15-4s-7e, Hamilton County, Illinois.

K. L. Kellogg & Sons, Long Beach, are the contractors for the General Petroleum Corp. 51 Harbor Community in the Long Beach harbor area, California.

Brewster-Bartle Drilling Co., Houston, has contract to drill Sun Oil Co. 10-C D. H. Braman as a northwest outpost to oil production at Sugar Valley field in Matagorda County, Texas. Contract depth is 9,100 ft.

Loffland Brothers Co., Tulsa, has the contract for the first four slant holes to be drilled by Richfield Oil Corp. under the Long Beach harbor. Richfield is tentatively planning to drill 75 wells from the old Navy pier at the foot of Pico Street. The company has a lease on 278 acres of submerged land and may operate not to exceed four strings of tools at one time.

J. C. Hawkins, Dallas, will drill Continental Oil Co. 4 King Corp., in the Indian Village field area, 29-7s-6w, Jefferson Davis Parish, Louisiana. Contract depth is 7,200 ft.

L. D. Cain Drilling Co., Houston, will drill H. L. Hunt 1 Long-Bell Petroleum Co., Inc., a wildcat 15 miles east-northeast of Neale field, Beauregard Parish, Louisiana, and in 28-2s-8w, 5½ miles east of DeRidder townsite. Contract depth is 10,500 ft.

General Petroleums, Calgary, Alta., has contract for Millet-Leduc 1, LSD 16, 6-48-24w4, to be drilled as a Devonian lime test for a group of Alberta companies in the Millet area, south and east of Leduc field.

California Commercial Drilling Co., Los Angeles, has the contract for two Obispo Oil Co. wells in Midway-Sunset field, California.

Spartan Drilling Co., Shreveport, has brought in an extension well to the west of Buckner field, Columbia County, Arkansas. The well is the A-2 Johnson-Nix, NW NE 16-16s-22w, and pumped 232 bbl. per day from 4,856-58 ft.

Cron & Gracey, Houston, is the contractor for the Shell Oil Co., Inc., 1 Jeanerette Lumber & Shingle Co.-State Unit "G," 10-14s-12e, St. Martin Parish, Louisiana. Projected depth is 8,100 ft.

Hayes Drilling Co., Mt. Carmel, Ill., and Central Pipe Line Co. have completed a producer for 1,500 bbl. per day at a location 4 miles west of Olney, Richland County, Illinois. The well is the 1A Fred Correll, SE SW SW 26-4n-9e, and production is from the Rosiclare at 2,936-45 ft. Hayes and Central are drilling their 1B Fred Correll and rigging up for their 1 W. F. Ridenour, NE NE NE 34-4n-9e, in the same county.

T. T. Eason, Mt. Vernon, Ill., has set surface pipe on a wildcat, the E. A. Obering 1 M. G. Armstrong, NE NE SE 20-3n-7e, Clay County, Illinois.

H. E. Ledbetter, Evansville, has opened a pool for Ashland Oil & Refining Co. at Ashland 1 J. Elkins, NW SW NE 12-1s-12w, Knox County, Indiana.

Northern Development Co., Edmonton, Alta., is finishing contract for Rogers & Bailey 2, SE 5, 35-48-28w3 in the Saskatchewan section of Lloydminster field.

Dwight M. Ross, Wichita Falls, has completed a Caddo discovery 3 miles north of Throckmorton, Throckmorton County, Texas, for J. H. Snowden of Fort Worth. The test flowed 938 bbl. per day and is the 1 Bailes Unit, Block 296, BBB&C Survey.

Baker & Heeger is the contractor for an **M & L Drilling Co.** wildcat in Marion County, Kansas, which is the 1 Melcher, NE NE NE 12-19-4e.

Pioneer Drilling Co., Mt. Vernon, Ill., is drilling two wells for Carter Oil Co. in Henderson County, Kentucky. Pioneer is testing the 1 N. M. Royster, NW NE SE 16-O-23, and drilling ahead on a wildcat, the I. J. Sellers, NE NE SW 22-O-23.

Calvert-Willis, Olney, Ill., is drilling a wildcat for Dean Smith, the 1 V. W. Smith, SE SE NE 25-1s-10e, Edwards County, Illinois. Calvert-Willis is drilling another wildcat in the same county, its 1 Ben Woods, W NE NW 30-1s-14w.

Rocky Mountain Drilling Co., Los Angeles, will drill Richfield Oil Corp. 1 North Side, an outpost well in the East Los Angeles area, California.

Meredith, Clegg & Hunt, Houston, have moved in a second rig into Holmwood field, Calcasieu Parish, Louisiana, for Sohio Petroleum Co., and are drilling at 7,024 ft. on their 1 Sweet Lake Land & Oil Co. Contract depth is 10,400 ft.

Camay Drilling Co., Los Angeles, is the contractor for the Southern California Petroleum Corp. 10 Adams-Aguirre, Ramona field, California.

Warren & Bradshaw Drilling Co., Mt. Vernon, Ill., are moving in material for the Texas Co. 1 Chalcraft, 7-1s-10e, Edwards County, Illinois.

Designed for portable drilling rigs, workovers and for handling small sizes of drill pipe on the largest rigs, this tong has proven most popular and successful. All diameters from 2⅜" to 8⅝" are perfectly gripped by using proper size latch lug jaws. Tong can be equipped with either short or standard levers, dependent on derrick conditions. Hinge pin holes are flame hardened to insure long trouble-free life. This tong, like the BJ type "B," is designed to meet unusually tough service conditions.

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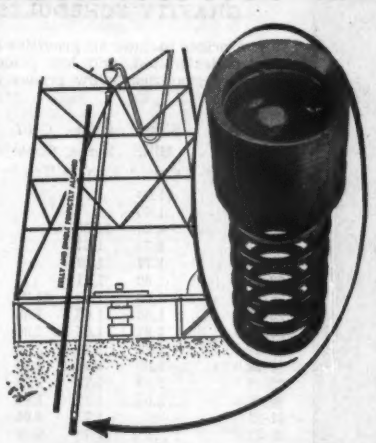
REDUCE TOOL JOINT WEAR



Used in the bottom of the mouse-hole, a "Joint Aid" absorbs most of the weight of the Kelly when it is set down on the single in the mouse-hole. Kelly and single are kept in alignment while connection is being made . . . galled threads are eliminated . . . connections are faster and easier . . . you're back on bottom *quicker* with a "Joint Aid" in the mouse-hole.

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OWEN TOOL COMPANY
HOUSTON, TEXAS

STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 5, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries								
													Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	45	23	0	*22	66,499	729	806	0	0	0	0	0	3	0	0	2	5
Pennsylvania	33	13	5	†15	53,466	1,401	2,053	0	0	0	0	0	0	0	0	1	1
West Virginia	20	2	13	5	55,203	402	351	0	0	0	0	0	0	0	1	0	1
Ohio	29	2	16	11	81,022	641	604	0	0	0	1	1	0	0	3	26	29
Indiana	15	7	0	8	28,021	300	173	0	0	0	2	2	8	0	0	24	32
Kentucky	16	5	3	8	35,415	304	238	0	0	0	3	3	6	0	0	25	31
Illinois	38	21	0	17	88,643	957	1,096	1	0	1	5	7	34	0	1	163	198
Michigan	17	5	5	7	34,323	379	402	0	0	0	4	4	5	0	8	105	118
Kansas	48	22	7	19	161,897	1,246	1,001	0	0	0	10	10	19	0	10	158	187
Neb., Mo., Iowa	0	0	0	0	0	2	9	0	0	0	0	0	0	0	0	2	2
Oklahoma	79	36	8	35	236,557	2,042	1,226	2	0	0	13	15	44	3	6	346	399
Texas	213	149	12	52	943,192	4,345	4,097	5	1	2	20	28	149	27	46	652	874
North Central (Dist. 7-B & 9)	65	39	1	25	210,170	1,363	1,470	0	0	0	8	8	52	0	7	218	277
West (Dist. 7-C & 8)	55	51	0	4	274,947	1,053	859	1	0	0	1	2	15	0	3	77	95
Panhandle (Dist. 10)	12	6	5	1	36,640	215	177	0	0	0	1	1	1	0	1	3	5
Eastern (Dist. 5 & 6)	11	8	1	2	68,139	246	379	0	0	0	0	0	4	0	3	53	60
Gulf Coast (Dist. 3)	24	18	1	5	154,537	774	910	2	1	0	4	7	37	20	19	138	214
Southwest (Dist. 1, 2 & 4)	46	27	4	15	198,759	694	302	2	0	2	6	10	40	7	13	163	223
Louisiana	29	17	0	12	183,662	629	686	0	0	0	5	5	18	11	7	89	125
Northern	20	11	0	9	105,240	333	363	0	0	0	5	5	1	1	3	50	55
Southern	9	6	0	3	78,422	296	303	0	0	0	0	0	17	10	4	39	70
Arkansas	4	1	0	3	19,976	131	96	1	0	0	1	2	1	0	0	25	26
Mississippi	10	7	0	3	85,570	229	138	0	0	0	2	2	0	0	1	46	47
Southeastern States	0	0	0	0	0	22	23	0	0	0	0	0	0	0	0	19	19
Montana	5	2	0	3	10,785	113	147	0	0	0	0	0	2	0	1	12	15
Wyoming	6	5	0	1	26,569	106	84	0	0	0	1	1	7	0	2	17	26
Colorado-Utah	4	2	0	2	18,579	93	67	0	0	0	2	2	1	0	1	23	25
New Mexico	7	7	0	0	32,642	258	187	0	0	0	0	0	4	0	1	19	24
California	40	29	3	8	193,423	1,012	931	3	0	2	6	11	25	0	5	149	179
Total United States	656	355	72	231	2,355,444	15,341	14,395	12	1	5	75	93	326	41	93	1,903	2,363
Total previous week	654	365	65	224	2,140,941	14,683	13,863	14	1	5	80	100	314	40	88	1,828	2,270
Total July 6, 1946	531	305	34	192	1,532,863			17	0	2	71	90	261	23	60	1,649	1,993

Service wells included: *22, †15.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
18-18.9	$1.80	....	....	....
19-19.9	1.65	....	....	....
20-20.9	1.69	$1.55	....	$1.42
21-21.9	1.73	1.57	....	1.44
22-22.9	1.77	1.59	....	1.46
23-23.9	1.80	1.61	....	1.48
24-24.9	1.84	1.63	$1.86	1.50
25-25.9	1.88	1.65	1.88	1.52
26-26.9	1.91	1.67	1.90	1.54
27-27.9	1.95	1.69	1.92	1.56
28-28.9	1.99	1.71	1.94	1.58
29-29.9	2.02	1.73	1.96	1.60
30-30.9	2.06	1.75	1.98	1.62
31-31.9	....	1.77	2.00	1.64
32-32.9	....	1.79	2.02	1.66
33-33.9	....	1.81	2.04	1.68
34-34.9	....	1.83	2.06	1.70
35-35.9	....	1.85	2.08	1.72
36-36.9	....	1.87	2.10	1.74
37-37.9	....	1.89	2.12	1.76
38-38.9	....	1.91	2.14	1.78
39-39.9	....	1.93	2.16	1.80
40 and above	....	1.95	2.18	1.82

*Standard Oil Co. of Calif. posting. †For crude from Daboval, El Campo, and Sandy Point. ‡Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED JUNE 28

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	883	2,168	269	1,039	1,578	20,511	6,260	11,678	8,246
Appalachian:									
District 1	92	275	36	69	85	2,321	282	424	249
District 2	72	310	26	44	115	1,091	110	147	139
Ind., Ill., Ky.	821	2,892	296	817	1,094	16,571	1,595	4,186	3,212
Okla., Kans., Mo.	423	1,520	196	478	491	8,384	687	1,734	1,121
Inland Texas	228	1,051	98	131	417	3,473	313	408	719
Texas Gulf Coast	1,178	3,854	604	1,444	1,718	14,407	2,309	6,999	5,636
Louisiana Gulf Cst.	390	1,085	327	557	497	4,379	1,636	2,087	1,329
No. La. and Ark.	69	184	47	62	111	1,632	282	509	140
Rocky Mountain:									
New Mexico	10	42	2	10	20	91	10	40	32
Other Rocky Mtn.	127	405	11	139	200	3,061	107	649	642
California	800	2,284	57	816	1,972	15,885	778	12,870	27,025
June 28, 1947	5,093	16,070	1,969	5,606	8,298	91,806	14,369	41,721	48,490
June 21, 1947	5,078	15,682	2,163	5,942	8,598	91,877	14,041	40,835	48,766
June 29, 1946	4,857	14,620	2,043	5,321	8,537	92,072	14,216	38,343	46,028

*At refineries including natural blended. †Finished and unfinished.

Bureau of Mines crude-oil stocks 236,221,000 bbl. as of June 28—up 561,000 bbl. One year ago 223,883,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.		Illinois Basin	2.07
East Texas	$1.95	Pecos County, Texas (Yates)	1.65
Kettleman Hills, California*	2.14	Bradford, Pennsylvania	4.30
Beauregard Parish	1.90	Eastern Ill. and Western Ind.†	2.07
		Tomball, Texas Gulf Coast	2.10

*37°-37.9°. †35° and above.

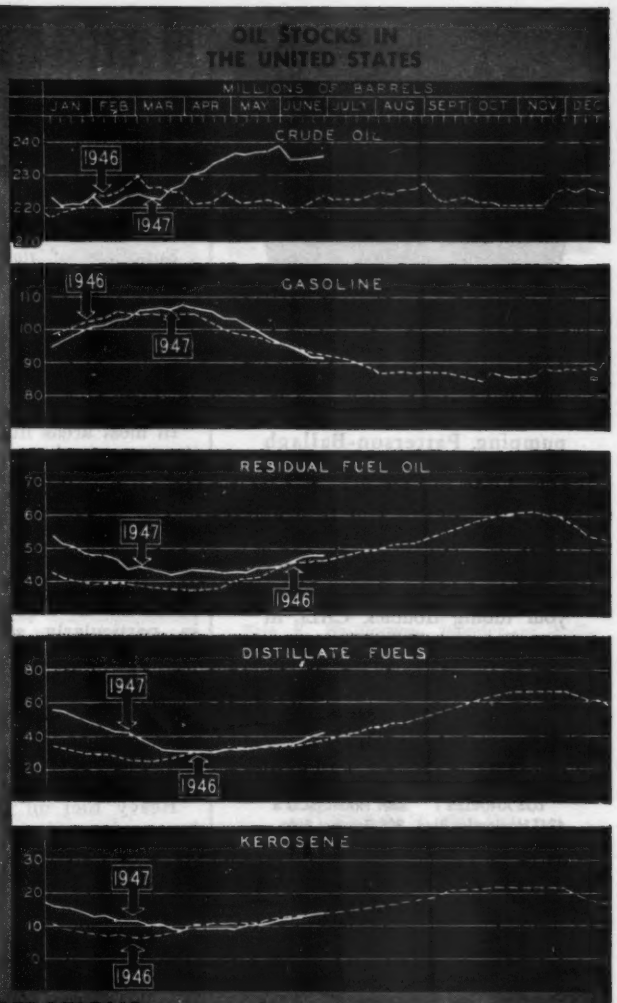
TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	July 5 crude oil	B. of M. July demand	June 28 crude oil
Alabama	1,100	1,200	1,100
Arkansas	80,950	80,000	81,000
California	920,000	900,000	920,700
Colorado	40,070	42,000	39,280
Eastern	64,600	65,400	65,500
Florida	1,200	600	1,015
Illinois	183,100	208,000	187,000
Indiana	18,000	18,000	17,300
Kansas	290,600	290,000	288,600
Kentucky	26,800	28,000	25,900
Louisiana	428,100	425,000	424,750
North Louisiana	104,900	.....	103,350
South Louisiana	323,200	.....	321,400
Michigan	40,915	45,000	41,060
Mississippi	95,510	90,000	96,400
Montana	24,630	24,000	24,630
Nebraska	550	600	550
New Mexico	107,210	104,000	106,000
Oklahoma	388,250	390,000	387,500
Texas	2,251,855	2,190,000	2,288,950
Dist. 1 (Southwest)	22,070	.....	21,650
Dist. 2 (Southwest)	164,730	.....	166,550
Dist. 4 (Southwest)	244,235	.....	247,720
Dist. 3 (Gulf Coast)	486,020	.....	494,480
Dist. 5 (Eastern)	39,500	.....	39,950
Dist. 6 (Eastern)	114,555	.....	116,100
East Texas field	328,285	.....	334,000
Dist. 7-C (West)	38,905	.....	39,000
Dist. 8 (West)	557,605	.....	560,750
Dist. 7-B (W. Central)	38,115	.....	39,500
Dist. 9 (N. Central)	132,355	.....	141,500
Dist. 10 (Panhandle)	85,480	.....	87,750
Wyoming	115,720	118,000	118,400
Miscellaneous	.....	200	.....
Total United States	*5,079,160	5,020,000	5,115,635
Change from prev. wk., dn.	36,475		

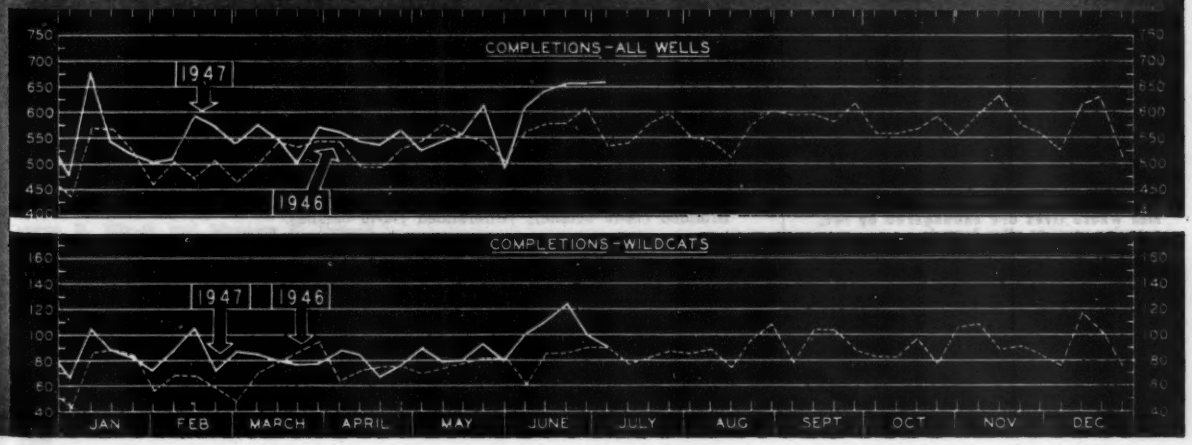
Total production January 1-July 5..... †915,567,080 bbl.
Same period last year (crude plus cond.).. 871,231,440 bbl.

*Not incl. 31,050 bbl. condensate. †Incl. 5,356,220 bbl. condensate.



DAILY OPERATIONS

Solid line charts weekly completions, service wells in Eastern area included.



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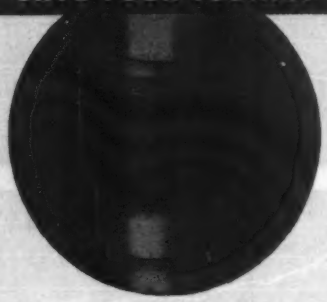

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MARKETS

SPOT-MARKET prices for petroleum products continued to range above posted prices of suppliers in the Mid-Continent area last week, as all products remained in short supply and demand continued strong.

Suppliers of natural gasoline reported allocations of available material to customers other than contract accounts in an effort to provide "equitable distribution" of the product. Suppliers reported a "heavy demand" continuing after recent raises totaling 0.5 cent a gallon.

In most areas little was moving on the open market, with most production of refineries committed under long-term contracts. A wide range in prices was evident in products available and moving on the spot market.

Gulf Coast Tight

On the Gulf Coast, products were in particularly short supply with many prices described as "out of line" for products actually available and being shipped. One shipment of regular-grade gasoline was moved at 9.625 cents a gallon. Premium gasoline still was reported unavailable on the spot market.

Heavy fuel oil there still was in heavy demand and commanding a wide range in price. Movements of the product during the past week were reported at both $1.73 and $2.50, representing the limits of the market.

Lubricating oils on the Gulf Coast were reported "practically unavailable" but still moving within previously posted prices. A sharp increase was expected in the very near future by suppliers.

In New York suppliers declared there is no prospect of gasoline allocations or rationing on the East Coast, voicing the opinion the supply outlook there is much more favorable than in the Midwest. They suggested spot shortages of gasoline might exist there during August, but predicted no serious lack of motor fuel.

The recent advance in Pennsylvania-grade crude oils, which sent the crude to prices higher than any in the past 26 years, was not expected to result in a general increase in Pennsylvania-grade lubricating oils. Suppliers expressed the belief that refiners would have to absorb the hike or price themselves out of the market. The spot market was extremely quiet in New York Harbor due to a lack of offerings. Buyers seeking heavy fuel oil found no offerings, or if so at a premium over posted prices.

California Prices Vary

In California the heavy-fuel-oil situation remained confused following the recent changes in postings by major companies. At last reports the new price schedule of Standard Oil Co. of California showed a 20-cent increase, while General Petroleum Corp. had advanced the product 30 cents and Union Oil Co. of California, 35 cents.

Difference in crude postings also was noted, with Union still offering a higher price than Standard for light refinable crudes.

In Texas, Sinclair Refining Co. and Continental Oil Co. followed Gulf Refining Co. in boosting tank-wagon gasoline prices a half cent. The companies on March 21 had raised prices a full cent, but reduced prices April 12 after Gulf had advanced prices only a half cent.

Over the nation during the week, demand for heavy fuel had shown a considerable increase, due in part to a threatened coal strike, apparently headed off through negotiations this week.

Representative Quotations

Representative spot-market quotations of leading suppliers as of July 7, 1947. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	8-8.75	10.1-10.4* 9.3-9.5†	8.5-9.5
Premium gasoline, 78-80 octane	8.75-9.5	10.3-12	9-9.5
42-44 w.w. kerosine	7-7.375	7.8	7-7.25
No. 2 straw fuel oil	6.125-7	6.3-7.1	6-6.5
No. 6 residual	$2.15-2.45	$2.32-2.50	$1.73-2.50

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.875	5.375	5.625
Grade 18-55	7.05	6.45	6.75

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11.5-12.5
750 vis., No. 3-4 neutral	13.5-15.25
2,000 No. 5-6 neutral	15-16.75

LUBRICATING OILS

Mid-Continent

150-160 vis. D bright stock, 0-10 p.p.	29
200 vis. No. 3 neutral, 0-10 p.p.	18-19

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	43
180 vis. 0 p.t. neutral	43

CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	7.75

Equipment Men in the News

Howard C. Wich, secretary of American Car & Foundry Co., New York, has been elected a director of the company.

O. E. MURREY

O. E. "Ted" Murrey has been elected president of Midwestern Engine & Equipment Co., Inc., Tulsa, to succeed **F. E. Stanley,** who has resigned. At the same time directors of the company elected **Armon H. Bost** vice president and general manager, **G. O. Glandon,** vice president and secretary - treasurer, and **Joe Hair** assistant secretary-treasurer. The resignation of Stanley will enable him to devote his full time to the operation of Midwestern Constructors, Inc., of which he is president. As in the past, Midwestern Engine & Equipment, distributors of general, pipe-line, and oil-field contractors' equipment, will continue to be independently owned and operated, with no intercompany relations with any other firm.

A. H. BOST

G. O. GLANDON

As officers of Midwestern Engine & Equipment Co., Inc., since its organization, Murrey, Bost, and Glandon all have widely diversified backgrounds in the sale of oil-field equipment. Murrey, after 13 years' experience in all phases of pipe-line construction, served for 7 years as sales manager for the pipe-line department of Cardwell Manufacturing Co., Wichita, prior to coming with Midwestern. Bost has had extensive experience in the public utilities, pipe-line, and oil industries. During the war he served for 5½ years on the General Staff, U. S. Army, being separated as colonel. Active in civic and military affairs, he is president of Reserve Officers Association of Oklahoma. Glandon is well known in the general contracting business, both nationally and in foreign countries. Hair, also with the company since its origin, has served as accountant and office manager.

Midwestern Engine & Equipment has warehouses in Chicago, Houston, Oklahoma City, and Tulsa.

Walter S. Fellows, operating as Oil Industry Appliances Co., is retiring from business because of ill health, and has turned over his accounts to R. S. Stokvis & Sons, Inc., 17 Battery Place, New York. **George R. Woods** and **Maurice F. Delano** are sales representatives for the company.

Malcolm P. Murdock has been appointed assistant general sales manager of Ethyl Corp. His work will be to coordinate customer relations and services. For the past 2 years, he has occupied an executive sales post with the Ethyl Specialties Corp. **Charles E. Colvin** has been appointed manager of the production planning section in the Baton Rouge manufacturing plant of Ethyl Corp. He succeeds **B. E. Perkins, Jr.,** who has resigned to enter private business.

M. E. Montrose has been appointed to the executive staff of Hughes Tool Co., Houston. Montrose, well known throughout the oil world, joins the company with 27 years of successful sales, engineering, manufacturing, and executive experience. He has assumed executive duties under **Fred W. Ayers,** senior vice president and managing director. After 13 years with General Electric Co., most of them in the Southwest, specializing in oil-well drilling and production activities, he resigned to accept an executive position with Lane-Wells Co. in Oklahoma. Moving to Houston as district manager in 1938, he was shortly elected director and vice president in charge of all services and sales with headquarters in Los Angeles. For the past 2 years he has been director, president, and general manager of Marion Power Shovel Co. in Marion, Ohio.

M. E. MONTROSE

Gus Baker, long-time employe of Frank Wheatley Pump & Valve Manufacturers, Tulsa, has recently been made sales manager. Baker has been with Wheatley for 15 years, and has worked in nearly every department. After several years in production work, he was named purchaser.

E. M. Platts has been appointed vice president in charge of sales of Joy Manufacturing Co., Pittsburgh. In his new position sales of all products of Joy, Sullivan, and La-Del divisions of the company for all industrial applications will be under his direction.

Over 200 operating executives and engineers from Gulf Coast refineries and chemical plants were guests at a barbecue given by Engineers & Fabricators at their plant in Houston recently. In addition to an open house showing various stages in the manufacture of heat-transfer equipment, two new electronic devices to measure the thickness of metals were demonstrated.

Col. A. E. (Cappy) Higgins has been named vice president of Rockwell International Corp., New York. He will maintain his headquarters at 7701 Empire State Building. He will not only have responsibilities in the export marketing of products of the various Rockwell divisions, but will also be assigned special duties in domestic marketing activities.

Erle P. Halliburton, founder of Halliburton Oil Well Cementing Co. and president of the firm since its incorporation in 1924, was elected chairman of the board at a recent meeting of stockholders. Replacing him as president is **John C. Halliburton,** who has served as vice president for the past 13 years. The organization which the board chairman founded in 1919 now operates in six foreign countries and employs 3,300 persons in oil-producing areas through-

(Continued on page 143)

On the sixty-fifth anniversary of the founding of W. C. Norris Manufacturer, Inc., a 3-day meeting was held at the company's plant and headquarters offices in Tulsa, during which the field sales executives were shown the latest improvements in company oil tools and quipment. Attending this meeting were: (top row) Marvin Parker, Odessa; Brooks Schofield, southern Oklahoma; Paul Nagaman, Illinois; Le Roy Mitchell, Tulsa, city salesman. (Second row) Lee Snelling, Tulsa, city salesman; Jim Bowen, Dallas and East Texas; Cliff Teel, West Texas; Arthur Miller, Louisiana; Cecil Fair, Kansas. (Third row) Bill Davidson, sales manager; Buck Tolleson, Kilgore; Rod Manis, Wichita Falls; and Jack Schatt, Indiana. Henry H. Paris, branch manager at Houston, was unavailable for the picture

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads except Situations Wanted, 10 cents a word. Minimum charge, $2.00 per insertion.
Situations Wanted ads, 5 cents a word. Minimum charge, $1.00 per insertion.
Centered Line, any ad, 75 cents.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

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$9.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Six New Kobe, 3½ inch tubing insert, pumps, one Triplex—Bargain for immediate sale. Ben Beckham, Jr., Box 134, Overton, Texas. Phone 3821.

FOR SALE: 250 new 8¾" OD 32# 8V Thread seamless steel couplings located at Oklahoma City. Price $4.50 each. Cities Service Oil Company, H. D. Patridge, Bartlesville, Oklahoma.

FOR SALE: Shaffer power draw works, powered by two J. L. 1335 Buda engines compounded. Suitable for 5,000 foot work. In A-1 condition. Price $7,500. Terms. Melton Well Service, Box 1360, Seminole, Oklahoma.

FOR SALE: 10,000 sq. ft. steel airplane landing mat, 15" x 10' Sections. Will make into portable all-weather lease road for hauling equipment, etc. 10c per sq. ft., F.O.B. Tulsa, Oklahoma. Subject to prior sale or withdrawal. Also have several light plants at bargain rates. Marshall Travis, 110 Midco Bldg., Tulsa, Oklahoma. Phone 5-2251.

EQUIPMENT FOR SALE

FOR SALE: Barber-Green ditcher, Model 44C, 18" X 5'6 boom equipped with new Chrysler 8 cylinder, 65 h.p. gasoline motor. Entire machine recently completely rebuilt. Can be inspected vicinity Rantoul, Franklin County, Kansas. Brundred Oil Corporation, 4722 Broadway, Kansas City 2, Missouri.

FARM TELEPHONES. New model handset wall telephones for farm lines—prompt delivery by parcel post. Write: Farm Telephone, Dept. 216, Rogers Park Station, Chicago 26, Illinois.

FOR SALE: 1—14" x 14" Ideal horizontal twin cylinder steam drilling engine. 3—15½" x 8½" x 20" Ideal steam slush pumps. Excellent condition. Priced right.
Lucey Products Corporation,
Tulsa, Oklahoma.

1 SUPER Wilson 46 Model, single drum, A mast telescoping pole, Buda Motor, mounted on GMC tandem truck. 1 H Cardwell 46 Model, single drum, 8 x 10 telescoping pole, mounted on tandem Studebaker. 1 Wilson Super skid job. Equipment can be seen at Pauls Valley, Oklahoma. Telephone 2032, Henderson, Ky.

1—New R. L. Double Drum Cardwell Unit powered with WAK Waukesha engine; 1—R. L. Model, Double Drum Cardwell in first class condition, new MO-893 Buda engine, new bearings in jack shaft and lower drum and relined brakes. Both good buys. Write T. C. S. Drilling Company, Rangely, Colorado.

FOR SALE: 4 slightly used Barrage Balloon winches. These are built for relatively light loads at high speed. Have large drums for long length of light line. Direct connected to 50-70 horse 6 cylinder Waukesha motor with clutch and three speed transmission. Should be useful for exploration or testing. Price less than motor cost. P.O. Box 4313 Memphis, Tenn.

FOR SALE: 83 SPEED STAR all steel Spudder on skids. Dual brakes, two forward speeds and instantaneous reverse on all reels. Cathead, telescopic derrick with power hoist, Hercules 6 Cyl. Engine with electric starter and Gasoline attachments. Approximately 3,500 Ft. ¾" and 9/16" practically new lines. Also ⅞" Non-Rotating casing line. Good condition. Price $6000.00. Contact Maurice Burdick, Phone #802, P. O. Box #3, Princeton, Indiana.

EQUIPMENT FOR SALE

STEAM DRILLING ENGINE, Gardner-Denver, Model DEA-1000-12" x 12", horizontal twin cylinders, excellent condition. Write or call Joseph Weidenhoff, Inc., 4340 W. Roosevelt Rd., Chicago, Ill., Mr. D. R. Kennedy, Nevada 3233.

PRICED TO SELL: 20—Size 2,000 gal. Gasoline Tanks mounted on Semi Trailers, 4 tires, size 900 x 20, Budd Wheels. Complete with transfer unit, hose, air brakes. Good for Oil, Tanks, Water, Gasoline, etc. Mfg. by The Heil Company. Independent Tank Company, Seminole, Oklahoma, Box 102, Phone 977.

FOR SALE: New 3" and 4" Drill Pipe with Tool Joints standard weights R-2. Box B-734, The Oil and Gas Journal, Tulsa, Oklahoma.

1 STAR 45 ST Spudder with Hercules engine. Both in excellent condition. No tools. Located 10 miles East of Drumright, Okla. 1 Ft. Worth Super D Spudder with practically two strings of tools, located on Lysite Mountain, Wyoming. Travco Equipment Company, 110 Midco Bldg., Tulsa, Oklahoma. Phone 5-2251.

PRICED FOR QUICK SALE

—One—12 x 12 Lucey Twin Cylinder enclosed oil bath Steam Drilling Engine Serial No. WL 234-GM 6000.

WILL H. SMITH
Box 686, Ardmore, Okla.

FOR SALE

7,500 Foot Full Electric Rig powered with two NKU Waukesha motors. Complete with two pumps, rotary, swivel, traveling block, blow-out preventor, 4½" drill pipe and all equipment except derrick to make complete rig. For full details call, wire or write

K. S. RICHARDS
Fort Worth 1, Texas
P.O. Box 443 Phone 3-5600

$52,500

COMPLETE 700 h.p.
Rotary Drilling Rig

Refer June 21 and June 28 issues of The Oil and Gas Journal, classified section, or write for detailed inventory.

Lucey Products Corp.
910 So. Boston Tulsa, Okla.

FOR SALE

IMMEDIATE DELIVERY

100 Tons 1¼" square reinforcing bars 20 to 30 ft. long. New mild steel. $95.00 Ton.
30 Tons 1" round deformed reinforcing Rods 30 ft. long. $95.00 Ton.
150 Rolls reinforcing wire mesh 5 gauge 87" wide x 77 ft. long in 550 lb. rolls @ $35.00 per roll.
9100 Ft. new 18 in. 16 gauge Galvanized corrugated nestable Culvert pipe. 90c ft. in large shipments.
394 Ft. 6" cast iron water main pipe, class 150 B. $1.50 per ft.
14 500-Gallon water tanks. $80.00 Each.

ST. LOUIS BOILER & EQUIPMENT CO.
L.D. 548 721 Olive St. Chestnut 1652
St. Louis, Mo.

FOR SALE
STEEL STORAGE TANKS

26—10,000 Gallon Capacity Tank Car Tanks

CLEANED PAINTED TESTED
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IRON & STEEL PRODUCTS, INC.
43 years' experience
13412 S. Brainard Avenue
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"ANYTHING containing IRON or STEEL"